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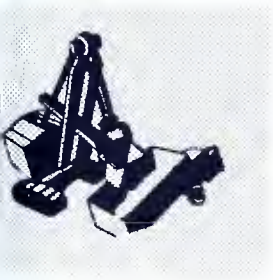
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The Mineral Industry of Pennsylvania in 1966

Charles C. Yeloushan



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF INTERNAL AFFAIRS

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BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY
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This publication is a chapter from the current Bureau of Mines Minerals Yearbook, comprising Volumes I-II, Metals, Minerals, and Fuels, and Volume III, Area Reports: Domestic. Individual chapters from Volume III and the separate volumes of the Yearbook are sold by the Superintendent of Documents, Washington, D.C., 20402.

The Mineral Industry of Pennsylvania

This chapter has been prepared under a cooperative agreement between the Bureau of Mines, U.S. Department of the Interior, and the Pennsylvania Bureau of Topographic and Geologic Survey for collecting information on all minerals except fuels.

By Charles C. Yeloushan ¹

Commodities produced by the mineral industry of Pennsylvania in 1966 were valued at \$903.4 million, a \$10.4 million decrease from that of 1965. Anthracite accounted for the greatest decrease of a single commodity with a \$21.4 million loss from that of 1965. Bituminous coal continued to be the backbone of the mineral industry in Pennsylvania, accounting for 47 percent of the total value and increasing

\$17.9 million over that of 1965. Production of stone continued to rise but the total value fell slightly. Cement, clays, and sand and gravel output remained relatively stable, but total values declined slightly. Peat, petroleum, lime, and zinc production increased while total values remained relatively constant.

¹ Mining engineer, Bureau of Mines, Pittsburgh, Pa.

Table 1.—Mineral production in Pennsylvania ¹

Mineral	1965		1966	
	Quantity	Value (thousands)	Quantity	Value (thousands)
Cement:				
Portland.....376-pound barrels..	40,153,219	\$116,925	40,003,833	\$114,357
Masonry.....280-pound barrels..	3,005,105	7,991	2,960,110	7,860
Clays ² short tons..	3,394,222	17,697	3,293,114	17,033
Coal:				
Anthracite.....do..	14,865,955	122,021	12,941,264	100,663
Bituminous.....do..	80,308,449	407,267	81,442,801	425,168
Copper.....do..	4,354	3,083	3,178	2,299
Gem stones.....do..	NA	4	NA	4
Lime.....short tons..	1,568,492	22,496	1,585,088	22,816
Natural gas.....million cubic feet..	84,461	22,551	90,914	25,820
Natural gas liquids:				
Natural gasoline and cycle products thousand gallons..	1,022	55	3,211	186
LP gases.....do..	1,683	109	1,863	121
Peat.....short tons..	45,600	527	52,912	562
Petroleum (crude) thousand 42-gallon barrels..	4,922	21,263	4,337	19,300
Sand and gravel.....short tons..	18,502,000	29,606	17,567,000	29,562
Stone.....do..	56,806,160	99,627	59,087,619	99,233
Zinc ³ (recoverable content of ores, etc.) short tons..	27,635	8,014	28,080	8,143
Value of items that cannot be disclosed: Clays (kaolin), cobalt, gold, iron ore, mica, pyrites, sericite-schist, silver, and tripoli..	XX	34,587	XX	30,281
Total.....	XX	913,823	XX	903,408

NA Not available. XX Not applicable.

¹ Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

² Excludes kaolin; included with "Value of items that cannot be disclosed."

³ Recoverable zinc valued at the yearly price of prime western slab zinc, East St. Louis market. Represents value established after transportation, smelting, and manufacturing charges have been added to the value of ore at the mine.

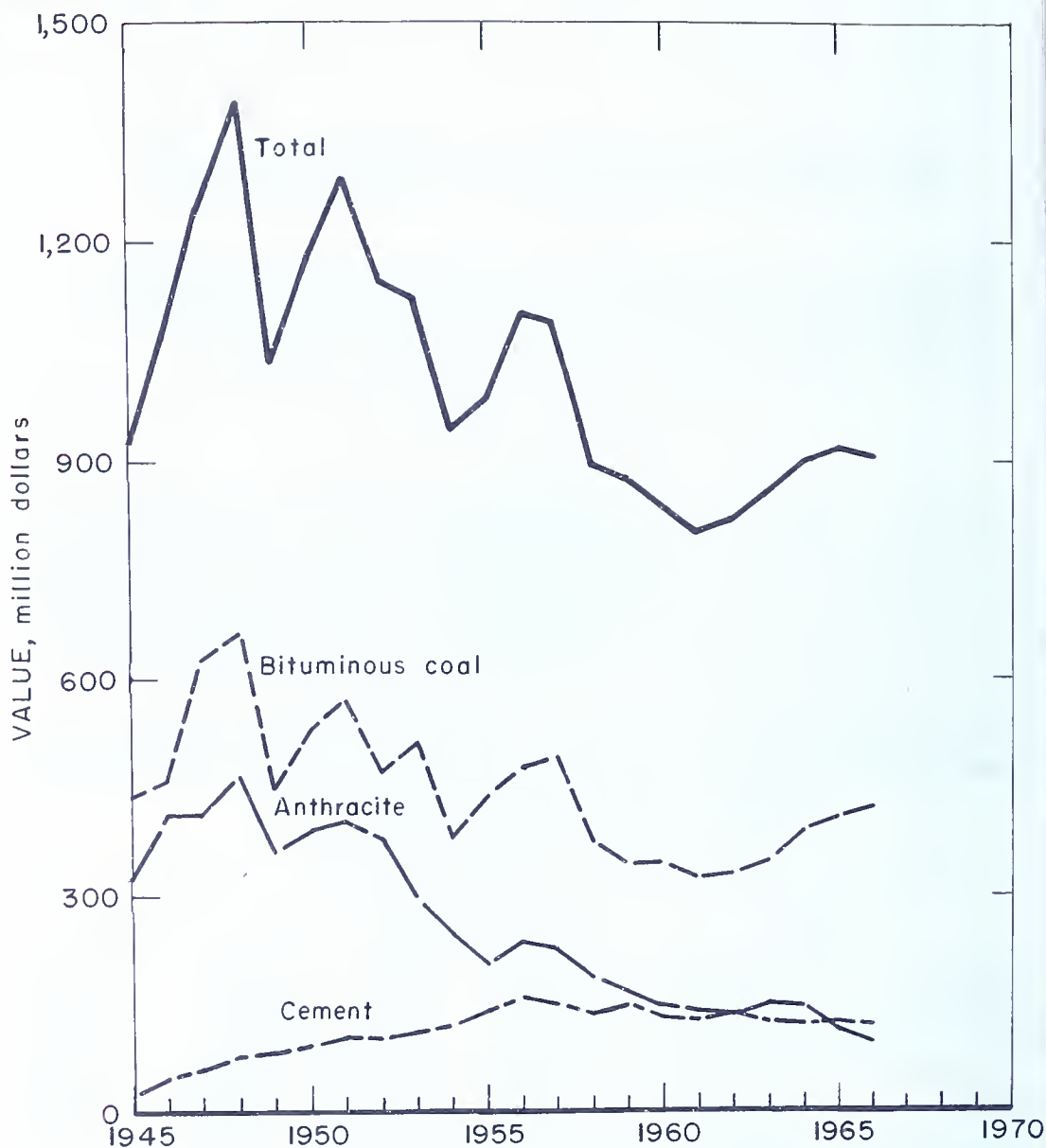


Figure 1.—Value of bituminous coal, anthracite, cement and total of mineral production in Pennsylvania.

Table 2.—Value of mineral production in constant 1957-59 dollars
(Millions)

Year	Value ¹	Year	Value ¹
1957.....	\$1,056	1962.....	\$860
1958.....	889	1963.....	908
1959.....	892	1964.....	946
1960.....	856	1965.....	960
1961.....	833	1966.....	^p 929

^p Preliminary.

¹ Data for 1957, 1959-65 revised.

Table 3.—Employment and injury experience in the mineral industries

Year and industry	Average men working daily	Days active	Man-days worked (thousands)	Man-hours worked (thousands)	Number of injuries		Injury rates per million man-hours	
					Fatal	Non-fatal	Frequency	Severity
1965:								
Bituminous coal.....	24,393	228	5,558	44,690	35	1,025	23.72	6,338
Anthracite.....	11,132	204	2,271	16,375	8	1,067	65.65	4,936
Metal.....	1,473	285	420	3,475	---	27	7.77	420
Nonmetal.....	1,601	252	404	3,309	2	135	41.41	4,421
Sand and gravel.....	1,157	237	275	2,300	---	46	20.00	329
Stone.....	8,393	271	2,273	18,582	6	303	16.63	2,674
Peat.....	59	194	11	90	---	1	11.05	309
Total.....	48,208	233	11,212	88,821	51	2,604	29.89	4,848
1966: ^p								
Bituminous coal.....	24,000	224	5,369	43,270	28	880	20.98	5,327
Anthracite.....	9,292	203	1,883	13,672	6	829	61.07	4,477
Metal.....	1,550	282	437	3,497	---	33	9.44	852
Nonmetal.....	1,750	251	439	3,578	---	137	38.29	766
Sand and gravel.....	1,210	228	277	2,351	1	49	21.27	3,869
Stone.....	8,260	268	2,216	18,217	7	320	17.95	3,375
Peat.....	60	225	14	109	---	---	---	---
Total.....	46,122	231	10,635	84,694	42	2,248	27.04	4,345

^p Preliminary.

REVIEW BY MINERAL COMMODITIES

FUELS

Coal (Anthracite).—Anthracite production continued to decrease, a 1.9-million-ton loss from that of 1965. The average value of anthracite was \$7.78 per ton, 43-cents below that of 1965. Of total shipments 6.9 million tons was by truck, 5.9 million tons by rail, and 141,000 tons used as colliery fuel. Underground production totaled 4.1 million tons of which 2.6 million tons was mechanically loaded by 383 conveyors and pit-car loaders (including duckbills and other self-loading conveyors), 151 scraper loaders, and 30 mobile loaders. Strip pits supplied 5.3 million tons, culm banks 2.9 million tons, and river dredging 662,000 tons.

By regions, Schuylkill accounted for 6.5 million tons, Wyoming for 3.5 million tons, and Lehigh for 2.9 million tons. Wyoming region led in value per ton with \$8.85, followed by Lehigh with \$7.98 and Schuylkill with \$7.12. Schuylkill region included all the dredging at \$3.46 per ton, of which 605,000 tons were dredged from the Susquehanna River and tributaries at \$3.48 per ton and 57,000 tons from the Schuylkill River and tributaries at \$3.16 per ton.

Men employed in the anthracite industry averaged 9,292 working daily (1,840 men less than in 1965). Productivity from all

operations except dredges averaged 6.6 tons per man-day, while dredge operations reported 31.3 tons per man-day for an overall average of 6.87 tons per man-day (0.3 ton better than in 1965).

Luzerne County continued to be the leading producer with 4.6 million tons, followed by Schuylkill County with 4.5 million tons and Northumberland with 1.4 million tons.

Retail dealer deliveries accounted for 2.7 million tons followed by electric utility consumption with 2.2 million tons. Exports, not including shipments to military forces, accounted for 766,000 tons, a decrease of 85,000 tons from that of 1965.

Six deaths were recorded in the anthracite industry at a frequency rate of 0.44 per million man-hours exposure. Of the six deaths, five occurred underground and one at a strip mine; three of the fatalities were at a mine employing four persons underground and two at mines employing 15 or more persons underground. All of the fatalities occurring underground were charged to falls of roof near the face and the strip mine fatality was the result of a fall from a payloader. Nonfatal injuries totaled 829 at a frequency rate of 61.07 per million man-hours exposure.

Coal (Bituminous).—Production of bituminous coal totaled 81.4 million tons at an

average price of \$5.22 per ton. The 50.9 million tons sold in the open market had an average price of \$4.23 per ton, whereas the 30.5 million tons not sold in the open market was valued at \$6.86 per ton. Of the total output, 63.2 million tons were shipped by rail or water, 16.4 million tons by truck and 1.8 million tons by other means.

Mine count totaled 1,088, of which 410 underground mines accounted for 55.8 million tons, 618 strip mines for 24.8 million tons, and 60 auger mines for 826,000 tons.

According to the Keystone Coal Buyers Manual, 16 coal companies produced over 1 million tons each in 1966: (1) Consolidation Coal Co. (including Pittsburgh, Mathies and Harmar Coal Companies), 7.7 million tons; (2) U.S. Steel Corp., 6.4 million tons; (3) Bethlehem Mines Corp., 6.2 million tons; (4) Republic Steel Corp., 3.5 million tons; (5) Jones & Laughlin Steel Corp., 3.0 million tons; (6) Barnes & Tucker Co., 3.0 million tons; (7) Duquesne Light Co., 2.5 million tons; (8) Gateway Coal Co., 2.1 million tons; (9) Rochester & Pittsburgh Coal Co., 1.8 million tons; (10) Eastern Associated Coal Corp., 1.7 million tons; (11) Imperial Coal Corp., 1.4 million tons; (12) North American Coal Corp., 1.3 million tons; (13) Benjamin Coal Co., 1.1 million tons; (14) C & K Coal Co., 1.2 million tons; (15) Buckeye Coal Co., 1.2 million tons; and (16) National Mines Corp., 1.1 million tons. These 16 companies accounted for 56 percent of the total production.

Underground mines in district 1 totaled 301 and accounted for 20.7 million tons, of which 17.6 million tons sold in the open market for \$4.64 per ton; 299 cutting machines cut 3.3 million tons; 171 mines loaded 20 million tons mechanically with 238 continuous miners, 66 mobile loaders (14 of which were used with continuous miners), and 105 hand-loaded face conveyors. District 2 had 109 underground mines accounting for 35.1 million tons, of which 8.0 million tons sold in the open market for \$4.99 per ton; 126 cutting machines cut 7.4 million tons; 68 mines loaded 34.9 million tons mechanically with 197 continuous miners, 170 mobile loaders (73 of which were used with continuous miners), and 8 hand-loaded face conveyors.

The 427 strip mines in district 1 accounted for 18.1 million tons, virtually all

of which was sold in the open market for \$3.69 per ton. Stripping was accomplished by 506 power shovels, 288 draglines (11 of which had over 12 cubic yards of capacity), 6 carryall scrapers (2 of which had over 12 cubic yards of capacity), 509 bulldozers, 155 power drills and 1,026 trucks. The 191 strip mines in district 2 recovered 6.7 million tons of coal with 220 power shovels (1 of which had a capacity over 12 cubic yards), 108 draglines (6 of which had over 12 cubic yards of capacity), 9 carryall scrapers (7 of which had over 12 cubic yards of capacity), 258 bulldozers, 81 power drills, and 448 trucks.

The 42 auger mines in district 1 produced 528,000 tons at an average price of \$3.64 per ton with 40 augers, 7 bulldozers, 12 power drills, and 73 trucks. District 2 had 18 auger mines which produced 298,000 tons at \$3.76 per ton with 24 augers, 4 bulldozers, 1 power drill, and 22 trucks.

Ninety-four preparation plants mechanically cleaned 55.3 million tons of coal, of which 47.2 million tons came from underground mines, 7.9 million tons from strip mines, and 159,000 tons from auger mines; 33.2 million tons cleaned by wetwashing other than jigs, 11.5 million tons by jigs, and 10.6 million tons by pneumatic methods. Coal was crushed at 210 plants for a total of 41.4 million tons with 63 plants treating 7.4 million tons with calcium chloride, oil, or other materials. Thermal drying was conducted at 15 plants with a total of 20 thermal units drying 6.9 million tons.

Twenty-eight fatal and 880 nonfatal injuries occurred during the year. Of the 28 fatalities, 25 occurred underground (11 from falls of rock, 5 on haulage, 4 on machinery, and 5 others), 1 on the surface (haulage), and 2 in strip mines (machinery). Injury rates per million man-hours exposure were 0.65 fatal and 20.34 nonfatal; per million short tons, 0.34 fatal and 10.84 nonfatal.

Mineral Industry's 1966 "Sentinels of Safety" was won by the Karen Mine of U.S. Steel Corp. at Fredericktown, Washington County, for operating 454,079 man-hours without a disabling injury. Participating in the contest since 1951, this operation won once before in 1963. Decker No. 4, Powell Coal Co., Kittanning, re-

Table 4.—Coal (bituminous) production, by counties

County	Number of mines				Production, thousand tons	Average price per ton
	Under- ground	Strip	Auger	Total		
Allegheny.....	14	17	2	33	5,301	\$6.01
Armstrong.....	40	42	9	91	5,383	4.08
Beaver.....	1	7	2	10	299	4.11
Bedford.....	7	3	---	10	286	4.75
Blair.....	2	1	1	4	77	3.82
Butler.....	11	40	5	56	2,163	4.39
Cambria.....	67	25	4	96	8,110	5.80
Centre.....	4	15	---	19	709	3.68
Clarion.....	3	77	1	81	3,334	3.73
Clearfield.....	38	97	9	144	7,273	3.64
Clinton.....	---	14	---	14	684	3.78
Elk.....	9	8	5	22	471	3.73
Fayette.....	16	21	1	38	859	5.36
Greene.....	20	5	---	25	12,123	6.67
Huntingdon.....	4	2	---	7	52	3.31
Indiana.....	54	29	5	88	7,660	4.39
Jefferson.....	23	43	9	75	1,664	3.89
Lawrence.....	---	27	2	29	1,149	2.60
Mercer.....	---	9	1	10	424	4.19
Somerset.....	58	70	1	129	4,129	4.33
Tioga.....	---	9	---	9	610	4.00
Venango.....	---	15	---	15	494	3.26
Washington.....	15	12	1	28	14,139	6.49
Westmoreland.....	24	24	1	49	3,909	5.47
Other counties ¹	---	6	---	6	141	3.77
Total.....	410	618	60	1,088	81,443	5.22

¹ Includes data for Bradford, Lycoming, and McKean Counties.

ceived recognition in the Underground-Coal Group of the National Safety Competition for its outstanding safety record in 1966 with 36,850 man-hours worked without a disabling work injury.

Coke and Coal Chemicals.—Oven-coke production totaled 18.7 million tons, a 1-percent decrease from that of 1965, and beehive-coke production totaled 609,600 tons, a 31-percent decrease from that of 1965. Oven-coke had an average value of \$15.80 per ton at the ovens (\$0.35 a ton more than in 1965); beehive coke averaged \$13.51 per ton at the ovens (\$0.43 per ton less than in 1965). Twelve oven-coke plants with 3,437 ovens (18 more than in 1965) were in operation at yearend. Oven-coke plants carbonized 26.8 million tons of coal and had a 69.75 percent yield of coke from coal. Seven beehive-coke plants, (five less than in 1965) with 1,284 ovens at yearend, carbonized 989,000 tons of coal and had a 61.64 percent coke yield.

Of the total oven-coke output, producing companies used 17.8 million tons in blast furnaces and 19,000 tons for other purposes and sold 867,000 tons to blast-furnace plants, foundries, other industrial plants and retail dealers for residential heating both in and out of the State. Of the 15.5 million tons of oven and beehive coke dis-

tributed in Pennsylvania, 15 million tons went to blast-furnace plants, 181,000 tons to foundries, 276,000 tons to other industrial plants, and 13,500 tons for residential heating.

Breeze recovered at coke plants totaled 819,400 tons at an average of \$6.31 per ton. Of the breeze used by producers, 528,800 tons were used in agglomerating plants, 80,800 tons in steam plants, and 85,600 tons for other industrial uses. Breeze sold on the open market totaled 102,700 tons at an average of \$6.95 per ton. Stocks of breeze on hand at yearend totaled 281,400 tons.

Coal chemicals produced at the oven-coke plants included 256,500 tons of ammonium sulfate equivalent; 244.1 million gallons of tar; and 80.2 million gallons of crude light-oil, from which were derived 50.8 million gallons of benzene, 11.1 million gallons of toluene, 3.4 million gallons of xylene, and 2 million gallons of solvent naphtha.

Natural Gas Liquids.—Production of natural gas liquids totaled 5.1 million gallons of which 3.2 million gallons was natural gasoline and cycle products and 1.9 million gallons was liquefied petroleum (LP) gases and ethane. Natural gasoline and cycle products were listed at 5.8 cents per gallon (5.4 cents in 1965) and LP gases and eth-

ane at 6.5 cents per gallon (same as 1965). Natural gas processing plants were located in Elk, Venango, Warren, and Allegheny Counties. Estimated proved recoverable reserves of natural gas liquids totaled 1.2 million (42-gallon) barrels at yearend, a decrease equal to the production of natural gasoline and cycle products.

Underground-storage capacity for LP gas was 1.1 million barrels located in four mined granite caverns in Delaware County and a mined shale cavern in Westmoreland County. An inground frozen earth cavity is being constructed in Philadelphia County by Philadelphia Gas Works (completion 1970) with a capacity of 1.2 million barrels.

Peat.—Peat production totaled 49,900 tons from 13 operations located in seven counties. Sales totaled 52,900 tons at an average price of \$10.61 per ton. Of the total sold, 62 percent was reported as humus, 33 percent reed-sedge, and 5 percent moss; 86 percent was sold in bulk for \$10.70 per ton and 14 percent packaged for \$10.10 per ton. Peat producers reported working on deposits totaling 1,051 acres (average depth of 52 feet) with 10.9 million tons of reserves. Processing equipment reported included 14 shredders, 4 hammermills, 1 grinder, and 10 screens. Lackawanna County was the leading producer followed by Luzerne and Lawrence Counties.

Petroleum and Natural Gas.—Production of crude oil totaled 4.3 million (42-gallon) barrels, a 12-percent decrease from that of 1965. The average value per barrel increased from \$4.32 in 1965 to \$4.45 in 1966. Productive oil wells decreased from 52,731 in 1965 to 48,000 in 1966.

Crude-oil operating capacity of 13 refineries on January 1, 1966 was 610,100 barrels per calendar day. Estimated proved reserves of crude oil at yearend totaled 72.4 million barrels.

Natural gas production totaled 91 billion cubic feet, an 8-percent increase from that of 1965. Productive gas wells increased from 17,516 in 1965 to 17,808 in 1966. Estimated proved recoverable reserves of natural gas at yearend totaled 1,351 billion cubic feet, an increase of 94 billion cubic feet from that of 1965. Of the total reserves at yearend, 501 billion cubic feet was held in underground reservoirs for storage purposes.

According to the Oil and Gas Section, Pennsylvania Bureau of Topographic and Geologic Survey, a total of 705 wells were drilled and 34 wells were deepened. Of the 705 wells, 277 were oil wells, 272 gas wells, 52 service wells, and 104 were dry holes. Of the 34 wells drilled deeper, 1 was an oil well, 29 were gas wells, and 4 were dry holes. The total footage of all wells drilled was 1,736,952 feet, of which 1,371,762 was development footage, 255,557 was exploratory footage, and 109,633 feet was service-well and miscellaneous drilling. Of the 111 deep wells, 73 were drilled in Erie and Crawford Counties; and of the 73 wells, 68 produce gas from the Medina and 1 produced from the Oriskany. There were 40 gas wells drilled in the Bushnell-Lexington pool and 17 gas wells in the Pierce pool. Of the 583 new shallow wells, 504 were drilled for purposes other than underground storage and secondary-recovery projects, 73 were drilled in secondary-recovery projects, and 4 were drilled for gas storage; 2 wells were stratigraphic tests. Of the 504 wells drilled, 245 were oil wells, 167 gas wells, and 92 dry holes. The total shallow-well footage drilled was 1,088,605 feet, including 24,582 feet of the 34 wells deepened.

Warren County continued to be the most active area with 168 new wells completed in the Glade and Clarendon Sandstones, including 151 oil wells and 17 dry holes. The second most active area was Indiana County with 66 gas wells and 11 dry holes. The Bradford Sandstone zones were the primary objectives. A third area of drilling activity was the Tionesta-Pleasantville area, where the Red Valley was the objective. One steam-flood project is active near Franklin in Venango County, where steam injection has been continued for more than 2 years. Seismic crews logged 68 crew-weeks during the year compared with 65 crew-weeks in 1965. Geological field parties were active in several areas.

NONMETALS

Cement.—Portland cement shipments decreased less than 1 percent from that of 1965 while the average price per 376 pound barrel decreased \$0.05 to \$2.86. Masonry cement shipments decreased 2 percent from that of 1965 while the average

price per 280 pound barrel remained constant at \$2.66. Portland cement was produced at 22 plants during 1966 with a total production capacity of 55.8 million barrels per year, an increase of one plant and 10 percent in total capacity from that of 1965. Masonry cement was produced at 16 plants during 1966.

Shipments of all types of portland cement from the 5 plants in western Pennsylvania totaled 10.8 million barrels at an average price of \$3.11 per barrel, of which 91 percent was types I-II (general use and moderate heat) and 3 percent was type III (high-early-strength); 50 percent was shipped to locations in western Pennsylvania, 38 percent to Ohio, 11 percent to West Virginia. Of the total shipped, 9.9 million barrels was by truck, 606,000 barrels by rail, and 263,000 barrels by boat. Shipments of all types of portland cement from the 17 plants in eastern Pennsylvania totaled 29.2 million barrels at an average price of \$2.77 per barrel, of which 87 percent was types I-II, 7 percent type III, and 3 percent white cement; 33 percent was shipped to locations in eastern Pennsylvania, 28 percent to New Jersey, 15 percent to New York, 6 percent to Connecticut, and 6 percent to Maryland. Shipments by truck totaled 18.4 million barrels and rail shipments 10.8 million barrels. Portland cement stocks at yearend totaled 1.9 million barrels in western Pennsylvania and 3.7 million barrels in eastern Pennsylvania. Of 11.4 million barrels of portland cement produced in western Pennsylvania, 6.1 million barrels was air-entrained; of 30.8 million barrels produced in eastern Pennsylvania, 6.0 million barrels was air-entrained.

Ready-mixed concrete companies purchased 6.5 million barrels of portland cement shipped from western Pennsylvania and 16.7 million barrels from eastern Pennsylvania; concrete product manufacturers accounted for 1.5 million barrels from the west and 6.5 million barrels from the east; building material dealers for 854,000 barrels from the west and 3.5 million barrels from the east, and highway contractors for 1.4 million barrels from the west and 1.6 million barrels from the east.

Shipments of masonry cement from 5 plants in western Pennsylvania totaled 1.1 million barrels at an average price of \$2.77 per barrel, of which 52 percent was shipped to locations in western Pennsylvania,

41 percent to Ohio, 4 percent to West Virginia, and 3 percent to Michigan. Shipments of masonry cement from 11 plants in eastern Pennsylvania totaled 1.9 million barrels at \$2.59 per barrel, of which 22 percent was shipped to locations in eastern Pennsylvania, 32 percent to New Jersey, 17 percent to New York, 6 percent to Virginia, 5 percent to Maryland, 4 percent to Connecticut, 4 percent to District of Columbia, 2 percent to Delaware, 1 percent to Ohio, and 1 percent to Wisconsin.

Chief raw materials used for the manufacture of portland cement in western Pennsylvania were limestone and cement rock (3.0 million tons), shale (198,000 tons), blast-furnace slag (143,000 tons), gypsum (88,000 tons) sand (87,000 tons), and diatomite (39,000 tons); in eastern Pennsylvania were limestone and cement rock (8.9 million tons), gypsum (269,000 tons), sand (123,000 tons), clay (95,000 tons), iron ore (20,000 tons), and blast-furnace slag (17,000 tons).

Cement industry in western Pennsylvania purchased 299 million kilowatt-hours of electrical energy and in eastern Pennsylvania purchased 700 million kilowatt-hours in addition to 85 million kilowatt-hours generated.

Northampton County was the leading portland cement producer. Other counties producing cement were Allegheny, Berks, Butler, Lawrence, Lehigh, Montgomery, and York.

Clays.—Production of fire clay totaled 1.6 million tons of which 1.1 million tons was used by producers and 88,000 tons were sold. Total clay production (excluding kaolin) decreased 3 percent in tonnage and 4 percent in value from that of 1965.

Lawrence County continued to be the leading clay producer followed by Clearfield, Beaver, and Berks Counties. Of the total fire clay produced, 46 percent was used for firebrick and block and 39 percent for building brick and other heavy clay products. Of the total miscellaneous clay and shale produced, 84 percent was used for building brick and other heavy clay products and 14 percent was used for portland and other hydraulic cements.

Kaolin was produced in Blair County for firebrick and block and in Cumberland County for white cement.

Table 5.—Clays sold or used by producers, by kinds and uses ¹

(Short tons)

Use	Fire clay		Miscellaneous clay	
	1965	1966	1965	1966
Refractories:				
Firebrick and block.....	821,411	738,262	-----	-----
Fire clay and mortar.....	41,125	W	-----	-----
Heavy clay products.....	612,191	627,370	1,373,089	1,404,763
Portland and other hydraulic cements.....	-----	-----	221,122	227,120
Undistributed.....	² 232,492	² 254,609	³ 92,792	³ 40,990
Total.....	1,707,219	1,620,241	1,687,003	1,672,873

W Withheld to avoid disclosing individual company confidential data.

¹ Excludes kaolin.² Includes exports, art pottery (1966), floor and wall tile, high-alumina brick, mortar (1966), clay crucibles, foundries and steelworks (bulk), other refractories, insecticides and fungicides, other filler, absorbent uses, and other uses.³ Includes art pottery, flowerpots, and glaze slip; floor and wall tile; foundries and steelworks (bulk); lightweight aggregate; and linoleum and oilcloth.

Gem Stones.—Mineral specimens were collected chiefly by hobbyists and amateur lapidarists at scattered locations throughout the State.

Graphite.—Production of manufactured (artificial) graphite was discontinued in Pennsylvania.

Iron-Oxide Pigments.—Crude iron-oxide pigments were mined in the form of sulfur mud in Cambria County. Finished iron-oxide pigments were produced and shipped from two plants in Northampton County and one plant in Carbon County. Finished pigments included natural and manufactured black, brown, red, and yellow pigments and mixtures of natural and manufactured red iron oxides.

Lime.—Quicklime and hydrated lime production increased 1 percent in tonnage and value from that of 1965. Of the 1.3 million tons of quicklime produced, only 32,000 tons were for agricultural purposes, and the rest for chemical, refractory, and construction uses. Of the 279,000 tons of hydrated lime produced, 249,000 tons were for chemical and construction and 30,000 tons for agricultural purposes. Quicklime averaged \$13.86 per ton and hydrated lime \$16.92 per ton. Sixteen plants were operated in 14 counties with Centre County again ranking first in production with three large plants producing quicklime and hydrated lime accounting for 46 percent of the total lime tonnage and 41 percent of the total value. Of the 16 plants, 3 plants sold quicklime, 1 plant used quicklime, 4 plants sold hydrated lime and 8 plants sold quicklime and hydrated lime. Regenerated quicklime was consumed at a

pulp and paper plant in Blair County. Of the total lime sold, 61 percent was consumed in Pennsylvania, 12 percent in Maryland, 7 percent in Ohio, 6 percent each in New Jersey and New York, and the remaining 8 percent in 16 other States, District of Columbia, Argentina, Canada, Chile, Jamaica, and Venezuela.

Mica.—Crude scrap mica was produced at a mine in York County for use in paint, roofing, rubber (mold lubricant), welding rods, textile coating, and other.

Perlite (Expanded).—Crude perlite from out-of-State sources was expanded at two plants in Allegheny County, and one plant each in Delaware, Lehigh, Montgomery, and York Counties. Lehigh County again led in expanded perlite production. Most of the expanded perlite was used for building plaster with the remainder for loose fill insulation, concrete aggregate, soil conditioning, fines, cryogenic applications, and filler.

Pyrites.—Pyrite concentrate was recovered by flotation in the milling process for magnetite iron ore in Berks and Lebanon Counties. The concentrate was then shipped to Sparrows Point, Md., for further processing.

Sand and Gravel.—Total sand and gravel production decreased 5 percent in tonnage from that of 1965. Of the total output 50 percent was sand for construction (building, paving, fill, and other uses), 41 percent was gravel for construction (building, paving, railroad ballast, fill, and other uses) and almost 9 percent was unground sand for industrial uses (glass, molding, grinding and polishing, blast, fire or fur-

nace, engine, and other uses). A small amount of ground sand was used for abrasives, chemicals, enamel, filler, glass, pottery, porcelain, tile, foundry, and other uses. The average price per ton for the total sand and gravel production increased from \$1.60 in 1965 to \$1.68 in 1966.

The leading producing county was Bucks County followed by Erie, Westmoreland, Beaver, Luzerne, and Huntingdon Counties. Company reports on 106 commercial operations in 43 counties showed that 51 percent of the operations produced less than 100,000 tons each for 12 percent of the total tonnage, 24 percent of the operations produced between 100,000 and 200,000 tons each for 21 percent of the total tonnage, 21 percent of the operations produced between 200,000 and 500,000 tons each for 39 percent of the total, 2 percent of the operations produced between 500,000 and 1,000,000 tons each for 7 percent of the total tonnage, and 2 percent of the

operations produced over 1,000,000 tons each for 21 percent of the total tonnage.

Of total production, 97 percent was processed; 67 percent was trucked to markets, 26 percent by waterways, and the balance by railroads.

Certificates for outstanding safety records were awarded by the National Safety Competition to the following companies for working without a disabling injury: Tionesta Sand & Gravel, Inc., Tionesta, 27,324 man-hours; General Concrete Products Corp., Warren, 26,344 man-hours; Shippingport Sand & Gravel Co., Shippingport and Georgetown, 25,234 and 24,350 man-hours, respectively; Houdaille Construction Materials, Inc., Portland, 26,297 man-hours; and Milton Grove Sand, Inc., Milton Grove, 21,230 man-hours.

Sericite-Schist.—Two mines in Adams County produced crude sericite-schist, which after processing, was used chiefly for a filler in asphalt and joint cement.

Table 6.—Sand and gravel sold or used by producers, by classes of operations, and uses

(Thousand short tons and thousand dollars)

Class of operation and use	1965		1966	
	Quantity	Value	Quantity	Value
Commercial operations:				
Sand:				
Molding.....	234	\$581	185	\$526
Building.....	5,566	7,575	5,228	7,698
Paving.....	3,374	4,902	3,362	5,183
Fire or furnace.....	140	406	87	270
Fill.....	42	43	20	19
Undistributed ¹	1,492	5,094	1,490	5,054
Total.....	10,848	18,601	10,372	18,750
Gravel:				
Building.....	3,522	4,987	3,005	4,346
Paving.....	3,418	5,241	3,522	5,758
Fill.....	321	200	328	163
Undistributed ²	361	511	292	472
Total.....	7,622	10,939	7,147	10,739
Total sand and gravel.....	18,470	29,540	17,519	29,489
Government-and-contractor operations:				
Sand: Paving.....	---	---	7	10
Gravel:				
Paving.....	32	66	---	---
Other.....	---	---	41	63
Total sand and gravel.....	32	66	48	73
All operations:				
Sand.....	10,848	18,601	10,379	18,760
Gravel.....	7,654	11,005	7,188	10,802
Total.....	18,502	29,606	17,567	29,562

¹ Includes glass, grinding and polishing, blast, engine, ground, and other sand.

² Includes railroad ballast, miscellaneous, and other gravel.

Stone.—Stone production increased 4 percent in total tonnage from that of 1965 while total value remained almost the same. Crushed stone totaled 58.9 million tons, of which 85 percent was limestone, 7 percent basalt, 4 percent sandstone, and the remaining 4 percent granite, slate, and miscellaneous stone; 58 percent was used for concrete aggregate and roadstone, 11 percent for furnace flux, 2 percent for agricultural purposes, 1 percent for railroad ballast, and the remaining 28 percent for other uses, including cement and lime manufacture, riprap, and limestone dust for coal mines.

Production of dimension stone increased slightly but the value decreased slightly. (See table 7.) Slate accounted for 30 percent of the dimension stone tonnage and 67 percent of its value while sandstone accounted for 37 percent of the tonnage and only 18 percent of the total value.

Northampton County continued to be the leading stone producer followed by Montgomery, Berks, and Lancaster Counties. Stone was also produced in 47 other counties.

Sulfur.—Sulfur was recovered in Delaware County at one refinery using the Claus-type process and at another refinery using single-stage catalytic oxidation of hydrogen sulfide. Hydrogen sulfide was recovered by the Gerbotol process using diethanolamine and monethanolamine, and molten sulfur was recovered by the improved Claus-type process at a plant in Philadelphia County. Another refinery in

Philadelphia County recovered sulfur by the Claus process.

Tripoli (Rottenstone).—Tripoli was mined and processed by two companies in Lycoming County for use as an abrasive compound and as a filler material.

Vermiculite (Exfoliated).—Two plants, one in Bucks County and one in Lawrence County, processed crude vermiculite and sold the exfoliated product for a variety of uses, chiefly for insulation, concrete aggregate, and agricultural use.

METALS

Cadmium.—Cadmium was recovered by St. Joseph Lead Co. at its Josephtown plant in Beaver County and by New Jersey Zinc Co. at its Palmerton plant in Carbon County.

Cobalt.—The cobalt content of pyrite concentrate shipments from the magnetite iron ore mines in Berks and Lebanon Counties again showed a slight increase over the previous year.

Columbium and Tantalum.—Columbium and tantalum compounds and metals were produced by Kawecki Chemical Co. in Berks County and Kennametal, Inc., in Westmoreland County from imported ore.

Copper, Gold, and Silver.—Copper concentrate was recovered by flotation of magnetite iron ore mined in Lebanon County and shipped to western refineries for processing. The concentrate also contained gold and silver.

Table 7.—Stone sold or used by producers, by uses

Use	1965		1966	
	Short tons	Value	Short tons	Value
Dimension stone:				
Building stone.....	90,378	\$1,334,311	108,023	\$1,471,731
Curbing and flagging.....	54,623	1,222,054	39,672	803,210
Other uses ¹	29,884	3,536,583	27,233	3,424,837
Total.....	174,885	6,092,948	174,928	5,699,778
Crushed and broken stone:				
Riprap.....	535,545	690,514	261,867	460,348
Concrete and roadstone.....	31,388,647	46,597,053	34,341,170	49,371,631
Furnace flux (limestone).....	6,289,387	11,197,022	6,300,021	12,063,633
Railroad ballast.....	609,816	929,114	620,375	931,310
Agricultural.....	1,236,490	3,731,886	1,266,862	3,865,644
Other uses ²	16,571,390	30,388,830	16,122,396	26,840,487
Total.....	56,631,275	93,534,419	58,912,691	93,533,053
Grand total.....	56,806,160	99,627,367	59,087,619	99,232,831

¹ Includes roofing slate and millstock.

² Includes refractory.

Table 8.—Stone sold or used by producers, by counties

County	1965		1966	
	Short tons	Value	Short tons	Value
Adams, Cumberland	4,558,149	\$11,516,082	¹ 1,022,042	¹ \$1,493,026
Allegheny, Clarion, Washington	648,356	1,282,643	505,685	1,016,852
Armstrong	326,222	688,284	374,865	783,240
Bedford, Franklin, Fulton	1,926,973	3,696,569	2,008,284	3,374,442
Berks	3,535,373	4,917,995	4,193,398	5,156,998
Blair, Huntingdon	1,751,989	3,864,976	² 1,548,793	² 2,413,892
Bradford	—	—	622	14,130
Bucks	3,367,985	4,614,913	3,359,514	4,429,945
Butler	1,479,334	2,836,027	1,545,155	2,836,619
Cambria	3,000	9,000	13,000	29,750
Carbon, Monroe, Schuylkill	846,089	2,222,169	1,001,854	2,215,703
Centre	2,803,809	4,798,857	2,735,923	4,405,167
Chester	2,665,405	5,671,473	2,390,644	4,910,888
Clearfield, Elk, McKean, Potter	126,582	348,721	³ 63,799	³ 249,773
Clinton, Lycoming, Tioga, Union	1,241,377	1,777,675	⁴ 1,271,793	⁴ 1,831,907
Dauphin	1,094,256	1,736,573	944,610	1,550,200
Fayette, Somerset	1,156,916	2,454,028	1,543,745	3,272,849
Jefferson	18,230	82,180	15,959	65,337
Juniata, Mifflin, Snyder	660,840	936,057	⁵ 460,357	⁵ 650,542
Lancaster	3,599,565	5,273,131	3,970,226	5,422,535
Lawrence	3,322,735	4,653,231	2,959,272	4,513,284
Lebanon	1,778,070	3,051,168	1,903,329	3,317,489
Lehigh	2,640,717	2,810,401	2,644,281	2,783,264
Luzerne	498,952	832,222	496,652	757,054
Montgomery	4,844,640	7,899,248	4,896,509	8,552,323
Northampton	5,503,516	8,772,578	5,783,588	9,116,035
Northumberland	58,700	95,700	68,840	111,840
Susquehanna	267,364	906,985	184,710	483,622
Wayne	163,756	331,085	123,329	263,696
Westmoreland	756,458	1,330,625	683,264	1,164,874
York	3,442,201	7,130,166	3,734,221	7,625,364
Other counties ⁶	1,718,601	3,086,605	6,639,356	14,420,191
Total	56,806,160	99,627,367	59,087,619	99,232,831

¹ Excludes Adams County.² Excludes Huntingdon County.³ No production in Clearfield County.⁴ No production in Tioga County.⁵ No production in Juniata County.⁶ Includes Adams (1966), Columbia, Delaware, Huntingdon (1966), Mercer, Montour, Perry, and Wyoming Counties.

Ferroalloys.—Production of ferroalloys decreased 28 percent from that of 1965 and totaled 501,000 tons. Shipments also decreased and amounted to 492,000 tons valued at \$97.3 million. There were 10 types (2 less than in 1965) of ferroalloys produced in the State, of which ferromanganese was the most predominant. Other significant ferroalloys produced included ferromolybdenum and spiegeleisen.

Iron Ore.—Usable iron ore production and shipments decreased 12 percent in quantity and 13 percent in value from that of 1965. Shipments were in the form of pellets produced at agglomerating plants located at the magnetite mines in Berks and Lebanon Counties. Crude magnetite was mined underground by block-caving methods. Most of the iron ore pellets were shipped to company-owned iron and steel plants in Pennsylvania and Maryland.

Iron and Steel.—Production of pig iron totaled 21.7 million tons, of which 92 per-

cent was basic, and the remainder Bessemer malleable, low phosphorus, foundry, direct castings, and an offgrade.

Receipts of iron ore totaled 28.3 million tons, 65 percent from foreign countries and 35 percent from domestic production. Consumption of iron ore totaled 26.8 million tons, 51 percent by agglomerating plants, 44 percent by blast furnaces, and the remainder by steel furnaces. Iron ore stock at beginning and end of year were 10.6 million tons and 11.2 million tons, respectively. Fluxes consumed by the iron and steel industry included 2.9 million tons of limestone, 3.2 million tons of dolomite and 980,000 tons of other type fluxes. Other materials consumed included 1.5 million tons of mill cinder and roll scale, 880,000 tons of raw flue dust, 1.5 million tons of steel furnace slag, 14.1 million tons of net coke, 690,000 tons of coke breeze, and 370,000 tons of anthracite. Steel furnaces consumed 18.7 million tons of pig iron and

hot metal, 11.2 million tons of home and purchased scrap, and 160,000 tons of slag scrap. Blast furnaces consumed 930,000 tons of home and purchased scrap, 230,000 tons of slag scrap, and 50,000 tons of pig iron and hot metal.

Agglomerates consumed in blast furnaces totaled 21.4 million tons, of which 67 percent was United States sinter (regular), and the remaining 33 percent was iron pellets (regular), semi-fluxing and self-fluxing sinter, foreign iron ore, and other agglomerates. Agglomerates consumed in steel furnaces totaled 400,000 tons, of which most were iron ore pellets (regular). Slag produced at blast furnaces totaled 6.4 million tons, scrap produced 160,000 tons, and flue dust recovered 940,000 tons.

Ten companies operated 20 plants. Fifty-one blast furnaces were operated at some time during the year, compared with 54 blast furnaces in 1965.

According to the American Iron and Steel Institute, steel production (ingots and steel for castings) totaled 32.1 million tons. Of the total steel production, 23.6 million tons were from open hearth and Bessemer, 5.2 million tons from basic oxygen process, and 3.3 million tons from electric furnaces. Production of hot-rolled steel products totaled 23.5 million tons; merchant bars and light shapes, 2.8 million tons; concrete reinforcing bars, 811,000 tons; wire rods, 962,000 tons; and blanks, tube rounds or pierced billets for seamless tubing, 1.9 million tons.

Smelters.—Zinc concentrates were shipped to smelters at Josephtown in Beaver County and at Palmerton in Carbon County. Zinc concentrates shipped to the Josephtown smelter came from New York, Missouri, Illinois, Tennessee, Canada, and Peru. Zinc concentrates and crude ore shipped to the Palmerton smelter came from New Jersey, New York, Pennsylvania, Tennessee, Indiana, Virginia, Colorado, and various foreign countries. Products

from the Josephtown smelter included zinc metal, lead-free zinc oxide, cadmium metal, and sulfuric acid, which were used in such consumer items as galvanized ware, die castings, and brass in the case of zinc; paint, rubber, ceramics, and pharmaceuticals in the case of zinc oxide; and protective coatings, bearings, and atomic uses in the case of cadmium. Products from the Palmerton smelter included slab zinc, zinc base die casting alloys, zinc oxide, rolled zinc, dry-battery shells, cadmium, and spiegeleisen.

The Josephtown smelter increased its output of zinc equivalent in 1966 to a record 216,910 tons from 202,657 tons in 1965. Slab zinc production and zinc oxide sales increased significantly in 1966. Industry use of zinc in brass and galvanizing increased. Galvanizing, which provides a zinc skin on steel for many years of maintenance-free protection, has recently been adopted in bridge construction. The Josephtown smelter, which operated at capacity throughout the year, increased that capacity in late March with installation of a new furnace able to produce 100 tons of zinc metal per 24-hour period. Zinc oxide production facilities were also increased and the company developed a new method for shipping zinc oxide in airtight, 5-ton-capacity rubber containers, ensuring purity of the product on delivery. A new 250-ton-per-day sulfuric acid unit, to replace one of the original ones, is now under construction.

Zinc.—Production of zinc ore (based on the recoverable zinc metal tonnage and value as metal established after transportation, smelting, and manufacturing charges have been added to the value of the ore at the mine) increased slightly over that of 1965. The zinc ore was concentrated at the mine in Lehigh County and the concentrates were shipped to the company's smelter in Carbon County.

REVIEW BY COUNTIES

Adams.—Bethlehem Mines Corp.'s new 600-ton-per-day lime plant located at the firms Hanover limestone quarry was in full-scale production. Stone from the quarry is calcined by three calcimatic kilns and the lime shipped 55 miles to the Sparrows Point steel plant. The Dravo Corp.

has overall responsibility for the project. In addition to supplying the lime plant, limestone produced at the quarry was sold for use as flux, concrete aggregate, roadstone, railroad ballast, agricultural purposes, clay filler, and stone sand. Limestone also was produced near Gettysburg by

Table 9.—Value of mineral production in Pennsylvania by counties ¹

County	1965	1966	Minerals produced in 1966 in order of value ²
Adams.....	W	W	Lime, stone, sericite schist, clays.
Allegheny ³	\$28,042,471	\$32,983,953	Coal, cement, clays, sand and gravel, stone.
Armstrong.....	22,687,658	25,138,199	Coal, clays, sand and gravel, stone, lime.
Beaver.....	4,449,172	3,639,419	Sand and gravel, coal, clays.
Bedford.....	W	W	Stone, coal, lime, sand and gravel.
Berks.....	W	W	Iron ore, cement, stone, clays, cobalt, coal, pyrites, sand and gravel.
Blair.....	2,180,478	W	Stone, coal, clays.
Bradford.....	389,510	664,920	Sand and gravel, coal, stone.
Bucks.....	W	W	Sand and gravel, stone, clays.
Butler ⁴	11,218,902	12,480,210	Coal, cement, stone, lime, sand and gravel.
Cambria.....	51,336,952	W	Coal, clays, stone, iron ore (pigment material).
Cameron.....	W	---	---
Carbon.....	4,624,670	4,885,309	Coal, stone, sand and gravel, peat.
Centre.....	W	16,396,017	Lime, stone, coal, sand and gravel, clays.
Chester ⁵	5,791,473	5,036,388	Stone, lime, clays.
Clarion.....	12,993,341	13,745,918	Coal, stone, sand and gravel, clays.
Clearfield.....	29,679,981	29,232,088	Coal, clays, sand and gravel.
Clinton.....	W	2,942,513	Coal, stone, clays.
Columbia.....	W	3,850,214	Coal, sand and gravel, lime, peat, stone.
Crawford.....	308,000	429,000	Sand and gravel.
Cumberland.....	W	W	Stone, sand and gravel, clays.
Dauphin.....	3,591,208	3,611,118	Stone, coal, clays, sand and gravel, lime.
Delaware.....	W	W	Stone.
Elk.....	W	W	Coal, stone.
Erie.....	W	W	Sand and gravel, peat.
Fayette.....	10,640,146	8,993,792	Coal, stone, clays, sand and gravel.
Forest.....	W	310,000	Sand and gravel.
Franklin.....	1,402,981	1,636,365	Stone, sand and gravel.
Fulton.....	W	W	Stone, sand and gravel.
Greene.....	W	W	Coal, clays.
Huntingdon.....	5,578,588	W	Sand and gravel, stone, coal, clays.
Indiana.....	W	W	Coal, clays.
Jefferson.....	8,400,759	W	Coal, clays, stone, sand and gravel.
Juniata.....	W	---	---
Lackawanna.....	W	W	Coal, sand and gravel, peat.
Lancaster.....	7,926,777	8,245,104	Stone, coal, clays, sand and gravel.
Lawrence.....	W	W	Cement, stone, coal, clays, sand and gravel.
Lebanon.....	22,776,493	21,571,924	Iron ore, stone, lime, copper, cobalt, coal, pyrites, gold, silver.
Lehigh.....	³ 10,824,551	29,017,306	Cement, zinc, stone.
Luzerne.....	W	40,677,402	Coal, sand and gravel, stone, peat, clays.
Lycoming.....	2,083,702	2,091,560	Stone, sand and gravel, coal, tripoli.
McKean.....	392,657	407,675	Clays, stone, coal, sand and gravel.
Mercer.....	W	2,476,343	Coal, sand and gravel, stone.
Mifflin.....	W	W	Sand and gravel, stone, lime.
Monroe.....	655,616	771,072	Stone, clays, sand and gravel, peat.
Montgomery.....	W	W	Stone, cement, lime, clays, sand and gravel.
Montour.....	W	W	Stone.
Northampton.....	60,458,181	57,326,162	Cement, stone, sand and gravel.
Northumberland.....	12,458,825	W	Coal, clays, stone, lime.
Perry.....	W	W	Stone.
Philadelphia.....	W	W	Sand and gravel.
Potter.....	W	W	Stone.
Schuylkill.....	43,796,225	37,123,723	Coal, stone, sand and gravel, clays.
Snyder.....	455,499	477,304	Stone, sand and gravel, coal.
Somerset.....	18,054,987	19,403,385	Coal, clays, stone, sand and gravel.
Sullivan.....	127,095	114,975	Coal.
Susquehanna.....	927,083	492,787	Stone, coal.
Tioga.....	1,764,081	2,504,665	Coal, sand and gravel.
Union.....	W	W	Stone.
Venango.....	W	2,359,860	Coal, sand and gravel.
Warren.....	470,000	644,000	Sand and gravel.
Washington.....	W	W	Coal, stone.
Wayne.....	713,085	W	Stone, sand and gravel.
Westmoreland.....	W	W	Coal, sand and gravel, stone, lime, clays.
Wyoming.....	758,817	720,319	Sand and gravel, stone.
York ⁴	7,986,401	8,924,263	Cement, stone, lime, clays, sand and gravel, mica.
Undistributed ⁶	517,876,635	502,082,440	
Total.....	913,823,000	903,408,000	

W Withheld to avoid disclosing individual company confidential data; included with "Undistributed."

¹ Pike County is not listed because no production was reported.² Excludes value of natural gas, natural gasoline, LP gases, petroleum, and gem stones unspecified by counties; included with "Undistributed."³ Excludes cement; included with "Undistributed."⁴ Excludes cement and lime; included with "Undistributed."⁵ Excludes lime; included with "Undistributed."⁶ Includes values indicated by symbol W.

Teeter Stone Division of H. T. Campbell Sons Corp. for use as concrete aggregate and roadstone. The Ruberoid Co. produced roofing granules and crushed stone for tennis court surfacing and asphalt filler from basalt rock quarried near Charmian. Summit Industries, Inc., mined crude sericite-schist from their Bendersville and Mount Hope mines, to be crushed, screened, and ground chiefly for use as an asphalt and joint cement filler at their plant near Aspers.

Undifferentiated clay and shale was produced for manufacturing building brick by Alwine Brick Co. near New Oxford.

Allegheny.—Bituminous coal production increased 6-percent over that of 1965. Underground production totaled 4.2 million tons, 3.6 million tons of which was not sold on the open market. Of the 14 underground operations, 11 loaded coal mechanically; 20 continuous miners with 14 mobile loaders produced 3.5 million tons; 22 mobile loaders produced 642,000 tons. Cutting machines cut 651,000 tons. Strip mines reported 27 power shovels, 9 draglines, 26 bulldozers, 11 power drills, and 37 trucks. Auger mines reported two augers, one bulldozer, and two trucks. Five preparation plants prepared 3.6 million tons of clean coal, 3.1 million tons of which was mined underground. Coal crushed totaled 4.2 million tons and coal treated totaled 2.4 million tons.

Portland and masonry cements were produced by Universal Atlas Cement Division, United States Steel Corp., near Universal and by Green Bag Cement Co., Division of Marquette Cement Manufacturing Co., near Pittsburgh. Most of the portland cement produced was of the general use and moderate heat type, but some high-early-strength type was also produced. Portland cement output was almost evenly divided between air-entrained and non-air-entrained. Most of the cement was shipped in bulk by truck. Primary customers were ready-mixed concrete companies.

Shale was produced near Wilkesburg for manufacturing building brick by Milliken Brick Co., Inc., at its Wilkesburg and Pitcairn plants. Undifferentiated clay and shale were produced near Creighton for building brick manufacture by Glassmere Brick & Tile Co. Sand and gravel was recovered near Harmarville by McCrady,

Inc., for paving purposes and industrial sand for foundry uses. Foundry sand was also recovered by Sidwell Loam Sand Co. near Pittsburgh. Bank sand for paving purposes was recovered by Burrell Construction and Supply Co. near Natrona Heights. Sandstone was quarried by Malli's Stone Quarry near Finleyville for stone walls and patio flagging and by Nick Gioia near Elizabeth for irregular-shaped stone for construction work. Expanded perlite, mainly for use in building plaster and loose fill insulation, was produced by Panacalite Perlite Co. near Pittsburgh and Perlite Manufacturing Co. near Carnegie. Clover Chemical Co. again reported an increase in the production of organic and inorganic iodine compounds from out-of-State crude iodine at a plant near Pittsburgh. Satellite Alloy Corp. manufactured silicon carbide near Springdale for use as a metallurgical-grade abrasive.

Armstrong.—Bituminous coal production totaled 5.4 million tons, a 12-percent increase over that of 1965. Of the total, 3.7 million tons was from underground mines, 1.5 million tons from strip mines, and 200,000 tons from auger mines. Of the underground production almost all of the tonnage was loaded mechanically by 20 continuous miners and 38 mobile loaders at 35 operations; 56 cutting machines cut 2.1 million tons. Strip mines had 51 power shovels, 21 draglines, 54 bulldozers, 1 carry-all scraper, 9 power drills and 114 trucks. Auger mines reported 12 augers, 4 bulldozers, 1 power drill, and 28 trucks. Seven preparation plants prepared 2.7 million tons of coal, most of which was produced from underground mines. Coal crushed totaled 2.5 million tons, and coal treated totaled 280,000 tons. Miscellaneous clay and shale was produced by Logan Clay Products Co. near Worthington for manufacturing vitrified sewer pipe at their Graff-Kittanning Division plant and drain tile at their Worthington Ceramics Division plant. Plastic fire clay was produced near Kittanning by both Howmet Corp. for the manufacture of firebrick and block, and Continental Clay Products Co. for building brick and other heavy clay products; near Adrian by Freeport Brick Co., Kittanning Brick Division, for pouring pit refractories; near Freeport, by Freeport Brick Co. for manufacturing firebrick; and near Templeton by Harbison-Walker Re-

fractories Co. for firebrick and block manufacture. Sand and gravel was recovered by Glacial Sand & Gravel Co. near Tarrtown; Manorville Sand Co., at Manorville; John Cihat, near Leechburg; and Emlenton Limestone Co., Inc., near Parker.

Limestone was produced near Kittanning by Manor Minerals, Inc.; in West Franklin Twp. by Black Limestone Co.; near Kittanning by C. D. McCanna; and near McWilliams and Girty by Mowrey & Good.

Beaver.—Building sand and gravel was recovered by a dredge in the Ohio River near Vanport by Dravo Corp., Keystone Division. Iron City Sand & Gravel Corp., dredged sand and gravel near Georgetown but ceased operations at this location at the end of June and moved to Hancock County, W. Va. Shippingport Sand & Gravel Co. recovered building sand and gravel at operations located near Georgetown and Shippingport. Shale was recovered near Darlington by Ralph A. Veon, Inc., for building brick manufacture. Plastic fire clay was produced for brick manufacture near New Brighton by Standard Clay Manufacturing Co. and by Colonial Clay Products Co. and Eastvale Clay Products Co. from respective underground mines near Fallston and Beaver Falls. Semiflint clay was produced by Darlington Brick Co., Division of General Dynamics Corp., at its Elsmen and Cain mines near Darlington for brick manufacture.

Strip mines producing bituminous coal reported using 10 power shovels, 5 draglines, 11 bulldozers, 1 power drill, and 8 trucks. The underground operation reported two mobile loaders loading into shuttle cars and one cutting machine. Auger mines reported the use of three augers and four trucks.

Bedford.—Limestone was produced near Everett by New Enterprise Stone & Lime Co. and by Bedford County Stone & Lime Co. near New Paris for use as concrete aggregate, roadstone, lime manufacture, and dust for coal mines. Crushed quartzite was produced by Leap Ganister Rock Co. at their Leap No. 1 quarry near Madley for refractory purposes and abrasives. Crushed sandstone was produced by Detwilers Industries, Inc., near Imler for concrete aggregate and roadstone. All bituminous coal production was shipped by truck; one continuous miner and two hand-load-

ed face conveyor loaded coal mechanically. Five cutting machines cut 5,400 tons and 20,000 tons was shot from the solid or cut by hand. Strip mines reported six power shovels, two draglines, eight bulldozers, one power drill, and five trucks.

Berks.—Crude magnetite ore was mined by Bethlehem Mines Corp. at its Grace mine near Morgantown. At the mine site the ore was crushed and ground, magnetically separated and the fine-sized material pelletized. Pyrite and copper concentrates were recovered by flotation and shipped to the company's Sparrows Point, Md., plant for processing. Allentown Portland Cement Co., Division of National Gypsum Co., produced portland and masonry cements, most of which was non-air-entrained, general use and moderate-heat type portland cement. Limestone for the cement plant came from company quarries near Oley and Evansville. Limestone also was produced near Kutztown by Keystone Quarry Co.; near Oley and Kutztown by Eastern Industries, Inc.; and near South Temple by Berks Products Corp. Output was used principally for concrete aggregate, roadstone, agricultural purposes, and railroad ballast. Basalt was produced by The John T. Dyer Quarry Co., near Birdsboro and by Pottstown Trap Rock Quarries, Inc., near Douglassville for railroad ballast, concrete aggregate, roadstone, and riprap. Bradford Hills Quarry, Inc., crushed traprock from the Grace mine near Morgantown for concrete aggregate and roadstone.

Martin Stone Quarries produced sandstone near Bechtelsville for concrete aggregate and roadstone. Reading Poultry Food Co. processed oystershell near Reading for mineral food and poultry grit. Shale was produced by Glen-Gery Shale Brick Corp. near Shoemakersville and Wyomissing for the manufacture of building brick.

Sand was recovered by Berks Silica Sand Corp., near Kutztown and processed in a stationary plant for building purposes.

Blair.—Limestone for use principally as concrete aggregate, roadstone, agricultural purposes, and asphalt filler, was produced by the following firms: Seymore Bros., Inc., Duncansville; Sproul Lime & Stone Co., Claysburg; Narehood Bros., Inc., Tyrone; New Enterprise Stone & Lime Co., Canoe Creek and Roaring Spring; Grannas Bros. Stone & Asphalt Co., Inc., Hollidaysburg;

and Eldorado Stone Co., Altoona. Quartzite was produced by Basalt Traprock Co. near Williamsburg for railroad ballast and by J. L. Hartman near Sproul for the manufacture of silica brick. Silica pebble rock was produced by General Refractories Co. at its Frankstown quarry near Hollidaysburg for silica brick manufacture and sandstone was crushed by Frankstown Sand Supply near Hollidaysburg for mason sand and building purposes. Plastic fire clay was produced at the Butler Mine near Williamsburg for the manufacture of firebrick and block by Harbison-Walker Refractories Co. Kaolin was produced near Williamsburg by Gran-nas Brothers for the refractory firebrick manufacture. West Virginia Pulp & Paper Co. regenerated quicklime in secondary recovery operations for use in the manufacture of paper at its Tyrone plant.

All underground production of bituminous coal was shot from solid or cut by hand. The strip operation reported 1 power shovel, 1 dragline, and 2 bulldozers.

Bradford.—Sand and gravel was produced at two operations near Towanda by State Aggregates, Inc., for building, paving, fill, and antiskid uses. Martin Stone Quarries near Sugar Run quarried bluestone for flagging. Bituminous coal was produced at only one strip mine on Sand Run reporting 2 draglines, 1 power shovel, 1 bulldozer, and 2 trucks.

Bucks.—Warner Co. recovered sand and gravel at its Van Sciver plant near Tullytown, mostly for use in ready-mixed concrete. Sand and gravel, principally for building purposes also was recovered by: Penn Valley Crushed Stone Co. at a stationary plant near Levittown; A. L. Lewis, Inc., at its plant No. 1 near New Hope and at its new plant No. 4 near Uhlerstown; Frank Casilio & Sons, Inc., and Durnan & Good, Inc., at Upper Black Eddy; and Silvi Concrete Products near Tullytown. Limestone was produced by New Hope Crushed Stone & Lime Co., near New Hope; Eureka Stone Quarry, Inc., near Eureka; Lester L. & Jack L. Kauffman near Rushland; and Bituminous Service Co., near Buckingham for concrete aggregate and roadstone. Better Materials Corp., produced argillite near Penns Park for concrete aggregate and roadstone. Gill Quarries, Inc., crushed bluestone near Trevoise for concrete aggregate and roadstone.

Basalt for concrete aggregate and roadstone was produced by Joseph Ciccone & Sons near Weisel; Vernon B. Horn near Chalfont; Edison Quarry near Edison; Bucks County Crushed Stone, Inc., near Ottsville; Derstine & Swartley near Telford; and The General Crushed Stone Co., near Quakertown. Coopersburg Granite Co. quarried basalt near Springfield which was finished for use as precision surface plates, architectural work and monuments. George Wiley crushed sandstone near Point Pleasant for concrete aggregate and roadstone. Dimension sandstone was quarried near Lumberville by Delaware Quarries for cut architectural stone and flagging. Shale was produced near Quakertown by Quakertown Brick & Tile Co., Inc., for the manufacture of building brick. Hyzer & Lewellen produced exfoliated vermiculite near South Hampton for use in home insulation, concrete aggregate, horticulture, plaster aggregate, and miscellaneous items.

Butler.—Underground production of bituminous coal totaled 556,000 tons cut by 17 cutting machines and 97-percent mechanically loaded by 8 mobile loaders and 3 hand-loaded face conveyors. Strip mines produced 1.5 million tons with 38 power shovels, 30 draglines, 3 carryall scrapers, 55 bulldozers, 22 power drills, and 125 trucks. Auger production totaled 133,000 tons with 8 augers and 9 trucks. Five preparation plants cleaned 805,000 tons of coal. Fourteen mine tipples crushed 1.2 million tons and two plants treated 94,000 tons of coal. Penn-Dixie Cement Corp. produced portland and masonry cements at its plant near West Winfield from limestone and industrial sand quarried nearby. Most of the portland cement was general use and moderate heat type, air-entrained and non-air-entrained, with a small amount of high-early-strength type also produced. Limestone also was produced by Sechan Limestone Co. near Portersville; Allegheny Mineral Corp., near Harrisville; Winfield Lime & Stone Co., Inc., near West Winfield; and Grove City Limestone Co., near Branchton. Output was used for concrete aggregate, roadstone, agricultural purposes, and blast furnace flux.

Mercer Lime & Stone Co. produced mostly quicklime for consumption in steel furnaces. Sandstone was quarried near Boyers by Annandale Sandstone Co., Division of

North Star Coal Co., for architectural purposes. Sand and gravel was recovered near Slippery Rock by Highway Sand & Gravel Co., Inc., and H. W. Cooper.

Cambria.—Underground mines produced 7.1 million tons of bituminous coal, 7.0 million tons of which was loaded mechanically at 35 mines with 89 continuous miners, 16 mobile loaders (of which 5 were used with continuous miners), and 32 hand-loaded face conveyors. Seventy-one cutting machines cut 873,000 tons. Strip mines reported 25 power shovels, 19 draglines, 27 bulldozers, 8 power drills, and 45 trucks. Auger mines reported 4 augers and 3 trucks. Ten preparation plants prepared 6.2 million tons of clean coal, most of which was mined underground. Twenty-two mine tipples crushed 4.2 million tons and eight plants treated 435,000 tons.

Miscellaneous clay was mined near Johnstown by Triangle Clay Products Co. for building brick manufacture. Plastic fire clay for use in manufacturing firebrick and block was mined from an underground coal mine near Patton by the Buck Hill Coal Co. and from the Frick mine near Blandburg by Harbison-Walker Refractories Co. Crushed sandstone was produced by Samuel Nicosia near Johnstown for silica brick manufacture and road sand. Sulfur mud for yellow iron oxide pigments was produced by Lanzendorfer Minerals Co. near Twin Rocks.

Carbon.—North American Refractories Co. produced quartzite for silica brick manufacture at its Little Gap quarry near Palmerton. Fauzio Brothers produced sandstone at its Red Rock quarry near Nesquehoning for concrete aggregate and roadstone. Sand for construction and industrial uses was recovered and processed by Alliance Sand Co., Division of Martin Marietta Corp., near Plamerton. Refractory Sand Co., Inc., processed sand for paving purposes near Andreas. Humus peat was produced by Blue Ridge Soil Pep (Hawk's Bog) near Weatherly and sold in bulk for general soil improvement. The Prince Manufacturing Co. reported production of finished natural black, brown, red, and a small amount of yellow pigments from its operation near Bowmanstown.

Centre.—The county continued as the leading lime-producing area. Most of the production was quicklime for chemical and

other industrial uses, chiefly for steel furnaces and paper and pulp mills. Limestone for a variety of construction, industrial, and agricultural uses was produced by Neidigh Bros. Limestone Co., Inc., near State College; Standard Lime & Refractories Co. Division and Appalachian Stone Division, of Martin Marietta Corp., both near Pleasant Gap; National Gypsum Co., and Warner Co., both near Bellefonte; and Black Hawk Limestone, Inc., near Centre Hall. Plastic fire clay was produced from the Blair mine near Stormstown for manufacturing firebrick and block by Harbison-Walker Refractories Co.

Strip mines producing bituminous coal reported 17 power shovels, 10 draglines, 16 bulldozers, 7 power drills, and 37 trucks. Three of the 4 underground operations loaded 257,000 tons of coal mechanically with 1 mobile loader, 1 continuous miner, and 3 hand-loaded face conveyors. Four cutting machines cut 180,000 tons. Two preparation plants prepared 498,000 tons of clean coal. Four mine tipples reported 618,000 tons of coal crushed.

Chester.—Limestone was produced near Downingtown by Bradford Hills Quarry, Inc., near Paoli and Devault by Warner Co. and near Malvern by the Appalachian Stone Division, Martin Marietta Corp. Output was used for concrete aggregate, roadstone, lime manufacture, agricultural purposes, and other uses. Basalt was crushed by V. DiFrancesco & Sons near Devault for concrete aggregate and roadstone. Dimension basalt was quarried by French Creek Granite Co. near Saint Peters for rough and dressed building stone.

Sandstone was quarried by Albert Rotunno near Avondale for construction work, curbing and flagging; by Valley Forge Building Stone Co., near Malvern, for construction and architectural work; and by John Fecondo & Sons and Abram T. Minor, both near Avondale, for construction work and flagging. Warner Co. produced high-magnesium lime at its Cedar Hollow plant near Devault, mostly for sewage and trade-wastes treatment. Undifferentiated clay and shale was produced near Phoenixville by McAvoy Vitrified Brick Co. for manufacturing building brick.

Clarion.—Strip mines accounted for 3.2 million tons of bituminous coal produced

and reported 60 power shovels, 39 drag-lines, 62 bulldozers, 15 power drills, and 115 trucks. One of the 3 underground mines loaded coal mechanically with 1 continuous miner loading onto conveyors. Six preparation plants prepared 2.5 million tons of clean coal, most of which was strip coal. Twelve mine tipples crushed 2.9 million tons of coal and 5 plants treated 94,000 tons with calcium chloride or oil. Limestone was produced near Turkey City by Emlenton Limestone Co., Inc., and near Parker by Allegheny Mineral Corp. for concrete aggregate, roadstone, agricultural purposes, and cement manufacture.

Plastic fire clay was produced at the Mayport Clay Works near New Bethlehem by Frank B. Pope Co. for manufacture of mortar, and from various open pits near Corsica by W. P. Stahlman Coal Co., Inc., for manufacturing clay crucibles. New Bethlehem Tile Co. produced fire clay and shale near New Bethlehem for the manufacture of brick and other heavy clay products. Sand and gravel was processed near Parker for building, paving, fill, antiskid, and recreational purposes by Glacial Sand & Gravel Co.

Clearfield.—Strip mines accounted for 5.9 million tons of bituminous coal produced and reported 142 power shovels, 90 drag-lines, 132 bulldozers, 60 power drills, and 350 trucks. At 21 of the 38 underground mines 1,159,000 tons of coal was loaded mechanically with 14 continuous miners, 8 mobile loaders, and 17 hand-loaded conveyors. Forty-two cutting machines cut 486,000 tons. Auger mines reported 9 augers, 9 power drills, and 11 trucks. Eight preparation plants prepared 2.9 million tons of clean coal 2.2 million tons of which was from strip mines. Thirty-one mine tipples crushed 3.8 million tons and 8 plants treated 193,000 with oil or calcium chloride.

Fire clay for manufacturing firebrick and block, high alumina brick, and mortar was produced by Harbison-Walker Refractories Co. at the Shimmel underground and Bigler open-cut mines near Bigler, Korb open-cut mine near Grampian, Woodland open-pit near Woodland, and Passmore open-cut mine near West Decatur. Plastic fire clay was produced by Thomas Brothers near Curwensville, for use in manufacturing ladle brick by Falls Creek Refractories

Co., Falls Creek; Clearfield Clay Products Co., Clearfield; and Blair Clay Products, Inc., Altoona. Other producers of plastic fire clay included: Hiram Swank's Sons, Inc., near Boardman; Lansberry Coal & Excavating Co. near Woodland; and A. P. Green Refractories Co., near West Decatur. Bartell Excavating, Inc., produced plastic fire clay in Knox Township for high-alumina brick but closed their pit early in the year. Williams Grove Clay Products Co., Inc., produced plastic fire clay and some undifferentiated clay and shale for firebrick and block and building brick near Bigler. Reese Brothers Coal Co. produced flint and plastic fire clay near Osceola Mills for manufacturing firebrick and block. American Vitriified Products Co., produced undifferentiated clay and shale near Clearfield for manufacturing vitrified sewer pipe. Flint fire clay was produced near Curwensville by Union Clay Co., Inc., for use in manufacturing portland and other hydraulic cements.

Clinton.—Strip mines producing bituminous coal reported 12 power shovels, 4 drag-lines, 13 bulldozers, 2 power drills, and 30 trucks. Three tipples reported 534,000 tons of crushed coal. Limestone was produced near Salona by Lycoming Silica Sand Co. for concrete aggregate, roadstone, and railroad ballast. Flint fire clay was produced near Lock Haven by R. C. Gillen & Son and by Fink & Stackhouse near Farrandsville. Mill Hall Clay Products, Inc., produced shale near Castanea for the manufacture of heavy clay products.

Columbia.—Sand and gravel was recovered and processed by Bloomsburg Sand & Gravel Co., Inc., near Bloomsburg, and by A. Barletta & Sons near Mifflinville. Limestone was produced near Lime Ridge by Baker Stone Co., for lime manufacture. Moss and humus peat was produced by Benton Peat, Inc., near Benton for general soil improvement.

Cumberland.—Limestone, for concrete aggregate, roadstone and agricultural purposes, was produced by: Valley Quarries, Inc., near Shippensburg; Pennsy Supply, Inc., near Bowmansdale and in Silver Springs Township; Bonny Brook Quarries near Carlisle; Locust Point Quarries, Inc., near Mechanicsburg; and Hempt Bros., Inc., near Camp Hill. Sand and gravel for

building and paving purposes was recovered and processed by R. A. Bender & Son near Mt. Holly Springs; C. and L. Goodhart, at Walnut Bottom; and Hempt Bros., Inc., near Mt. Holly Springs. White kaolin was produced near Mt. Holly Springs by The Philadelphia Clay Co. for use in the manufacture of portland and other hydraulic cements. Stoneware clay was processed through kilns by Penn Products Corp. near Boiling Springs for black ceramic floor tile and art pottery.

Dauphin.—Limestone was produced near Hummelstown by George E. Ebersole & Sons; near Palmyra by H. E. Millard Lime & Stone Co.; and near Steelton and Harrisburg by Hempt, Bros., Inc. High-calcium hydrated lime for agricultural purposes was produced by H. E. Millard Lime & Stone Co., at its Swatara plant. Basalt was crushed by Faylor Lime & Stone Co., near Elizabethville for concrete aggregate and roadstone. Shale was produced at operations near Harrisburg and Middletown by Glen Gery Shale Brick Corp. for the manufacture of facebrick. Sand and gravel was recovered and processed at a stationary plant near Duncannon by Pennsy Supply, Inc.

Delaware.—Basalt was crushed for concrete aggregate and roadstone by The General Crushed Stone Co., near Glen Mills and by V. DiFrancesco & Sons near Havertown. Dimension sandstone was quarried by Media Quarry Co., near Media. Dimension granite was quarried at two locations near Marple by Carl Galantino, Inc., for use in construction and architectural work. Dimension mica schist was quarried by Di Bonaventura Quarries, Inc., near Springfield for rough building stone and by F. Cantono & Sons at their Foxcroft quarry near Broomall for dressed building stone and rubble.

The Insul-Fil Manufacturing Company, formerly known as Perlite Products Company, expanded perlite near Primos chiefly for use in building plaster. Sinclair Refining Co., at its Marcus Hook refinery, produced liquid sulfur as a byproduct, using a Claus-type process. Sun Oil Co., Marcus Hook, produced byproduct sulfur in single stage catalytic oxidation of hydrogen sulfide.

Elk.—Strip mines accounted for 325,000 tons of bituminous coal and reported 16 power shovels, 6 draglines, 17 bulldozers, 4

power drills, and 26 trucks. Six of the 9 underground mines loaded 102,000 tons mechanically with 1 continuous miner, 2 mobile loaders, and 7 hand-loaded face conveyors. Thirteen cutting machines cut 96,000 tons. Auger mines reported 4 augers, 1 bulldozer, and 7 trucks. No preparation plants were reported in operation, but 3 mine tipples crushed 172,000 tons of coal. Crushed sandstone for concrete aggregate and roadstone was produced by Clark Construction Co., near Johnsonburg.

Erie.—Sand was recovered by dredging near Erie for sale to wholesalers by Erie Sand Steamship Co. Sand and gravel also was recovered by Nickel Plate Sand & Gravel Co., near Fairview; Quirk Excavating at a stationary plant near Union City; Clark Construction Supply Co., Inc., at a stationary plant near Erie; North Girard Concrete Works at a plant near Lake City; and Peerless Mineral Products Co., near Springfield. Humus and reed-sedge peat was produced by Corry Peat Products Co., near Corry for general soil improvement.

Fayette.—Three of the 16 underground mines loaded 511,000 tons of bituminous coal mechanically with 7 continuous miners and 5 mobile loaders (of which 4 were used with continuous miners). Strip mines accounted for 283,000 tons and reported 25 power shovels, 3 draglines, 27 bulldozers, 10 power drills, and 19 trucks. The auger mine reported one auger, one power drill, and two trucks. Four preparation plants prepared 5.3 million, mostly from underground mines in Greene County. Five mines tipples crushed 858,000 tons.

Limestone was produced near Lake Lynn and Uniontown by Appalachian Stone Division, Martin Marietta Corp. for concrete aggregate, roadstone, agricultural purposes and for coal mine dust. Commercial Stone Corp., produced limestone near Belle Vernon for riprap, concrete aggregate, and roadstone. Bluestone was produced near Connellsville by Connellsville Bluestone Co. for concrete aggregate and roadstone. Quartzite ganister was produced by General Refractories Co., near Layton for the manufacture of silica brick. Shale was produced near Layton by Layton Fire Clay Co. for building brick manufacture. Flint and plastic fire clay for manufacturing firebrick and high alumina brick was produced at the Ohiopyle strip near Union-

town by Kaiser Refractories, Division of Kaiser Aluminum & Chemical Corp., and by Robert N. Matthews from his Gettemy strip near Uniontown. Flint fire clay was produced near Ohiopyle by Harbison-Walker Refractories Co. for the manufacture of firebrick and block. Sand and gravel was recovered by dredging near Point Marion for building and paving purposes by McClain Sand Co., Inc.

Franklin.—Limestone was produced near Chambersburg by Valley Quarries, Inc.; near Dry Run by New Enterprise Stone & Lime Co.; and near Williamson and Zullinger by Appalachian Stone Division, Martin Marietta Corp.; J. R. Zeek quarried dimension sandstone near Orrstown for construction work. Sand was recovered and processed for building purposes by Mt. Cydonia Sand Co., Inc., at a stationary plant near Fayetteville. Caledonia Sand Co. recovered bank-run sand for building purposes near Fayetteville.

Greene.—Most of the tonnage of bituminous coal produced was from underground mines and not sold in the open market. Seventeen of the 20 underground mines loaded 12.0 million tons of coal mechanically with 89 continuous miners and 49 mobile loaders (of which 42 were used with continuous miners). Eight cutting machines cut 156,000 tons. Strip mines reported 6 power shovels, 6 bulldozers, 1 dragline, 2 power drills, and 12 trucks. Four preparation plants prepared 6.4 million tons of clean coal, all of which was mined underground. Five plants crushed 5.0 million tons and two plants treated 451,000 tons with oil.

Huntingdon.—Industrial sand was recovered and processed by Pennsylvania Glass Sand Corp., at its Keystone Works near Mapleton Depot for a wide range of uses, including glass, molding, chemical, ceramics, abrasives, engine, metallurgical, and autoclave. Limestone was produced at the Shade Gap plant near Orbisonia by L. H. Parsons Stone & Lime Co.; near Orbisonia and McConnellstown by New Enterprise Stone & Lime Co.; and by Warner Co. at its Union Furnace operation near Tyrone. Quartzite was produced near Three Springs by North American Refractories Co., for silica brick manufacture.

Plastic fire clay was produced by Alexandria Fre Clay Co. near Alexandria for use

in the manufacture of mortar. Strip mines producing bituminous coal reported 4 power shovels, 2 draglines, 3 bulldozers, 2 power drills, and 3 trucks. Of the 4 underground mines 1 loaded coal mechanically with one hand-loaded face conveyor. The auger mine reported one auger, one power drill, and one truck.

Indiana.—Thirty-eight of the 54 underground mines loaded 6.6 million tons of bituminous coal mechanically with 74 continuous miners, 13 mobile loaders (of which 5 were used with continuous miners), and 3 hand-loaded face conveyors. Thirty-six cutting machines cut 151,000 tons. Strip mines accounted for 871,000 tons and reported 36 power shovels, 11 draglines, 1 carryall scraper, 37 bulldozers, 7 power drills, and 78 trucks. Auger mines reported 5 augers, 1 bulldozer, and 6 trucks. Fourteen preparation plants prepared 5.4 million tons of clean coal, all of which was produced underground. Nineteen mine tipples crushed 2.7 million tons and seven plants treated 343,000 tons with oil and other materials.

Plastic fire clay was produced near Clymer by Roy E. Foehrenbach for firebrick and block manufacture. Hiram Swank's Sons, Inc., produced a small amount of plastic fire clay from their Swank No. 6 underground mine near Clymer but closed the mine during the year.

Jefferson.—Strip mines accounted for 916,000 tons of bituminous coal and reported 49 power shovels, 18 draglines, 52 bulldozers, 4 power drills, and 108 trucks. Sixteen of the 23 underground mines loaded 605,000 tons of coal mechanically with 14 continuous miners and 14 hand-loaded face conveyors. Twenty-nine cutting machines cut 121,000 tons. Auger mines reported 7 augers, 2 bulldozers, and 16 trucks. Four preparation plants prepared 844,000 tons of clean coal. Seventeen mine tipples crushed 863,000 tons and four plants treated 193,000 tons with calcium chloride. Plastic fire clay was produced at an underground mine near Summerville by Hanley Co. for building brick manufacture. Vitrified sewer pipe was manufactured from clay mined near Brockway by The Brockway Clay Co. Limestone was produced by Sugar Hill Limestone Co., near Brockway for concrete aggregate, roadstone and agricultural pur-

poses. Brockway Sand & Gravel recovered bank-run sand near Brockway for paving purposes.

Lackawanna.—Sand and gravel was recovered and processed at a stationary plant near Moscow by Contractors Sand & Gravel, Inc., mostly for ready-mixed cement. Peat was produced by Wayne Peat Humus Co., Inc., near Gouldsboro and by Lake Linda Peat Co., Inc., near Dalton for general soil improvement.

Lancaster.—Limestone was produced by A. G. Kurtz & Sons, Inc., near Denver; Belmont Limestone Co. near Paradise; Rohrer's Quarry, Inc., near Lititz; J. Miller Eshleman & Son, Inc., near Landisville; The Blue Ball Stone Co., Inc., near Blue Ball; D. M. Stoltzfus & Son, Inc., near Talmage, Quarryville and New Texas; H. R. Miller near Lancaster; Bradford Hills Quarry, Inc., near Morgantown; Heisey Brothers Quarries near Rheems; Binkley & Ober, Inc., near East Petersburg; and J. M. Brenner Co. near Lancaster; The J. E. Baker Co., near Bainbridge; Compass Quarries, Inc., near Gap; Ivan M. Martin, Inc., near Blue Ball; and David M. Burkholder, Inc., near Ephrata.

Shale was produced near Ephrata by Glen Gery Shale Brick Corp. for building brick manufacture. Plastic fire clay was produced near Narvon by Narvon Mines Ltd. for use in drywall joint cement, insecticides and fungicides, foundries, animal feed concentrates, and building brick. Lancaster Brick Co. produced miscellaneous clay near Lancaster and purchased shale from Roger E. Gerhart, Inc., near Lititz for the manufacture of building brick. Sand was recovered and processed at a stationary plant near Milton Grove by Milton Grove Sand, Inc., for building, paving, and anti-skid purposes. Sand was also recovered near Honey Brook and Brownstown.

Lawrence.—Portland and masonry cements were produced by Bessemer Cement Company, Division of Diamond Alkali Co., near Bessemer and by Medusa Portland Cement Co., near Wampum. Most of the portland cement was general use and moderate heat, although both companies also produced some high-early-strength cement. Most of the shipments were made in bulk by trucks to ready-mixed concrete companies.

Limestone for use as a blast furnace flux and for cement manufacture was produced

near Hillsville by United States Steel Corp.; for cement manufacture near Wampum by Medusa Portland Cement Co., and for concrete aggregate, roadstone, and cement manufacture by Bessemer Cement Co., Division of Diamond Alkali Co. Limestone also was produced by New Castle Lime & Stone Co., in Mahoning Township and by Mooney Bros. Supply Co., near West Pittsburg. Plastic fire clay for use in foundries, building brick and vitrified sewer pipe, was produced near Enon Valley by Ralph A. Veon, Inc.; The Negley Fire Clay Co. near New Galilee; and Jack Craig Coal & Clay Co., near Wampum. McQuiston Coal Co. produced plastic fire clay and shale near Bessemer for building brick manufacture. Shale was produced near New Castle by Fenati Brick Co., Inc., for manufacturing brick. Bessemer Cement Co., Division of Diamond Alkali Co., produced shale at their No. 7 quarry near Bessemer for use in portland and other hydraulic cements. Medusa Portland Cement Co. produced shale near Wampum for portland cement manufacture. Keystone Loam & Clay Co. produced miscellaneous clay near Edinburg for foundry use.

Sand and gravel was recovered and processed at a stationary plant near West Pittsburg by Mahoning Valley Sand Co. and by Superior Sand & Supply Co. near New Castle. Zonolite Division, W. R. Grace & Co. produced exfoliated vermiculite near Ellwood City chiefly for loose fill insulation and agricultural use. Strip mines accounted for 1,129,000 tons of bituminous coal and reported 30 power shovels, 25 draglines, 40 bulldozers, 9 power drills, and 49 trucks. Auger mines reported 2 augers and 3 trucks. Coal crushed at 6 mine tipples totaled 366,000 tons. Peat was produced by D. M. Boyd Co., and Welker Greenhouses, Inc., near Leesburg.

Lebanon.—Crude magnetite, containing valuable byproducts such as copper, gold and silver, pyrite, and cobalt was mined by Bethlehem Mines Corp. at Cornwall. The crude ore was processed at the Cornwall concentrator (1) by crushing and grinding, magnetic separation and cinderling the fine-sized material to produce a concentrated iron cinder, and (2) by flotation and agglomeration to recover copper concentrates (containing gold and silver) and pyrite concentrates (containing cobalt).

Limestone was produced by Fiala, Inc., and H. E. Millard Lime & Stone Co., near Annville; and by Sheridan Slag Co., and Calcite Quarry Corp., near Lebanon. Output was used for blast furnace flux, concrete aggregate, roadstone, railroad ballast, agricultural purposes, cement, and lime manufacture. Whitmoyer Laboratories, Inc., reported consumption of crude iodine in manufacturing inorganic and organic compounds at its plant near Myerstown.

Lehigh.—Portland and masonry cements were produced by Coplay Cement Manufacturing Co., near Coplay, and by Lehigh Portland Cement Co., near Fogelsville. Portland cement was also produced by Giant Portland Cement Co., near Egypt and by The Whitehall Cement Manufacturing Co., near Cementon. Most of the portland cement was shipped in bulk by truck to ready-mixed concrete companies and concrete product manufacturers. A major portion of the portland cement production was of the general use and moderate heat type and non-air-entrained.

Each of the cement companies produced limestone for use in the manufacture of cement at operations near the plants. Limestone also was produced by Eastern Industries, Inc., near Stiles and by Lehigh Stone Co., near Ormrod for concrete aggregate, roadstone, and cement manufacture. Penn Big Bed Slate Co., Inc., quarried slate near Slatedale for use as roofing slate, structural and sanitary slabs, blackboards, flagging, and other cut stone uses. The Pennsylvania Perlite Corp. expanded perlite near Allentown chiefly for use in the manufacturing of building plaster and cryogenic applications. Zinc sulfide ore mined and concentrated at the Friedensville mine was shipped to a smelter at Palmerton for recovery of zinc metal.

Luzerne.—Sand and gravel was recovered by Airport Sand & Gravel Co., Inc., near Wyoming Glendale Sand & Stone Co. in Pittston Twp.; Frank B. Sgarlat Sand & Gravel Co., near Forty Fort; J. A. & W. A. Hess, Inc., near Nescopeck; No. 1 Contracting Corp. of Delaware at a stationary plant near West Pittston; and A. Barletta & Sons near Nescopeck. Sandstone for concrete aggregate and roadstone was produced by No. 1 Contracting Corp. of Delaware near Drums; American Asphalt Paving Co. near Shavertown; Coolbaugh Sand & Stone, Inc.,

near Dupont and The General Crushed Stone Co. near White Haven. Shale was recovered from refuse coal banks near Wilkes-Barre by the Bylite Corporation to produce light weight aggregate for use in building blocks and structural concrete. Hazleton Brick Co. produced miscellaneous clay near Hazleton and Pottsville for use in the manufacture of building brick. Peat was produced near White Haven by Blue Ridge Soil Pep Co., Inc. Pennsylvania Peat Moss, Inc., and Stiller's Blue Ridge Peat Co. and near Wilkes-Barre by Bald Mountain Peat Corp.

Lycoming.—Limestone was produced by Lycoming Silica Sand Co., at its Lime Bluff quarry near Muncy and at its Pine Creek quarry near Jersey Shore for concrete aggregate, roadstone, and agricultural purposes. Sand and gravel was recovered by Lycoming Silica Sand Co., near Montoursville. Irregular-shaped sandstone was quarried by Rummings Bluestone Co., near Slate Run for construction work. Slate flour was produced by Keystone Filler & Manufacturing Co. near Muncy. Penn Paint & Filler Company and Keystone Filler Manufacturing Co. produced tripoli (rottenstone) for sale as a filler and abrasive material. Bituminous coal was produced at 4 strip operations, which reported 3 power shovels, 3 draglines, 4 bulldozers, 2 power drills, and 5 trucks. Two tipples crushed 103,000 tons of coal.

McKean.—Shale was produced near Lewis Run by Hanley Co. for building brick and floor and wall tile manufacture. Kane Stone Co. produced sandstone near Kane for concrete aggregate, roadstone, and riprap. Sand for industrial purposes was recovered near Eldred. Bituminous coal was produced at one strip operation reporting 1 power shovel, 2 draglines, 2 bulldozers, and 4 trucks. Coal was crushed at one tipple.

Mercer.—Strip mines producing bituminous coal reported 12 power shovels, 9 draglines, 16 bulldozers, 2 power drills, and 20 trucks. One preparation plant was active and used pneumatic equipment. Four mine tipples reported 96,000 tons of crushed coal. Sand and gravel was recovered by Seidle Sand & Gravel, Inc., near Mercer; by Transfer Sand & Gravel Co. in Pymatuning Township; at a stationary plant near Big

Bend by Taylor Sand & Gravel Co., and near Hadley by Atlas Sand & Gravel, Inc. George Hazen recovered bankrun gravel for paving purposes near Clarks Mills. Crushed sandstone for concrete aggregate, roadstone, riprap, refractory furnace lining, ferrosilicon, filler, foundry, and recreation purposes was produced by White Rock Silica Sand Co., near Greenville.

Mifflin.—Industrial sand was recovered and processed by Pennsylvania Glass Sand Corp. at its Hatfield Works in McVeytown. James R. Kline's Sons recovered sand for building purposes near Lewistown. George E. Miller Coal Co. recovered sand for building purposes and gravel for paving purposes near McVeytown. Limestone was produced by Bethlehem Mines Corp. at its Naginey quarry for metallurgical flux, concrete aggregate, roadstone, stone sand, and pulverized stone; by Derry Limestone Co., near Lewistown and George E. Miller Coal Co., near McVeytown for concrete aggregate and roadstone; and by Honey Creek Lime Co., near Reedsville for lime manufacture. Haws Refractories Co. produced crushed quartzite near Hawstone for the manufacture of silica brick.

Monroe.—Hamilton Stone Co. produced limestone near Bossardsville for concrete aggregate, roadstone, and cement manufacture. Miscellaneous clay was produced near Kunkletown by Universal Atlas Division of United States Steel Corp. for portland and other hydraulic cement manufacture.

Sand and gravel was recovered and processed at a stationary plant near Stroudsburg by Javelyn Mobile Mix, Inc.; near Kunkletown by Sheesley Minerals, Inc.; and at a stationary plant near East Stroudsburg by Robert Lee & J. Stanley Hallett. Peat was produced by World Wide Peat Co., near Blakeslee and by Pocono Peat Co., near East Stroudsburg for general soil improvement.

Montgomery.—Limestone was produced by Glasgow Quarry, Inc., near Conshohocken; Bradford Hills Quarry, Inc., near Norristown; by G. & W. H. Corson, Inc., near Plymouth Meeting; by Allentown Portland Cement Co., near West Conshohocken; and by Bethlehem Mines Corp., at its McCoy quarry near King of Prussia, and at its Bridgeport quarry. Dimension granite was quarried at the Marcolina Bros., Inc., Hillcrest quarry near Laverock. Mignatti Con-

struction Co., Inc., crushed granite near Bethayres for concrete aggregate and roadstone.

Basalt was crushed by Kibblehouse Quarries, Inc., near Perkiomenville and Pottstown Trap Rock Quarries, Inc., near Sanatoga for concrete aggregate, roadstone, and riprap. Montgomery Stone Co., Inc., quarried basalt near Montgomeryville for rough and dressed dimension stone and crushed stone for concrete aggregate and roadstone. Crushed quartzite was produced near Glenside by Firestone Products Co., Inc., for refractory furnace lining and irregular-shaped stone for construction and for furnace lining without further processing. Vecchione Brothers quarried dimension sandstone near Glenside for architectural work. Argillite stone was crushed by M & M Stone Co., near Harleysville for concrete aggregate and roadstone. Crushed bluestone was produced by Gill Quarries, Inc., near Spring House and Norristown for concrete aggregate and roadstone. Portland and masonry cements were produced by Allentown Portland Cement Co., near West Conshohocken and by G. & W. H. Corson, Inc., near Plymouth Meeting. Most of the portland cement was general use and moderate heat type, non-air-entrained. Shale was produced near Trappe by Philadelphia Brick Co. for the manufacture of heavy clay products. The Keller Pottery Co. produced common clay near North Wales for the manufacture of flower pots.

Sand and gravel for construction purposes was processed near Norristown by William Bambi & Sons, Inc., but this company went out of business at yearend. Refractory & Insulation Corp. expanded perlite near Port Kennedy for use as concrete aggregate and filler.

Northampton.—The county continued to be first in the production of cement, with 8 plants shipping almost 18 million barrels of portland and masonry cement. Ready-mixed concrete companies purchased most of the cement with a significant quantity purchased by concrete product manufacturers. Thirty-five kilns were used during the year. North Bangor Slate Co. produced slate near Bangor for roofing, flagging, and aquarium bottoms, and expanded slate for lightweight aggregates. Also near Bangor, D. Stoddard & Sons, Inc., processed raw slate for structural, sanitary, and black-board uses, and Pennsylvania Lightweight

Aggregate, Inc., produced crushed slate for granules and expanded slate for lightweight aggregate. Near Pen Argyl slate was produced by Albion Vein Slate Co., Diamond Slate Co., Anthony Dally & Sons, Inc., Stephens-Jackson Co., and Doney Slate Co. Output was used for structural and sanitary work, blackboards, billiard table tops, roofing, flooring, and flagging. Emerald Slate Corp. produced slate near Wind Gap.

Limestone was produced by The Trumbower Co., Inc., near Nazareth and by Bethlehem Mines Corp. near Bethlehem for concrete aggregate, roadstone, railroad ballast, agricultural purposes, clay filler, stone sand, and riprap. Limestone for cement manufacture was produced by National Portland Cement Co. near Bethlehem; Dragon Cement Co., Inc., and Universal Atlas Cement Division of U.S. Steel near Northampton; Keystone Portland Cement Co. near Bath; Lone Star Cement Corp., Penn-Dixie Cement Corp., and Nazareth Cement Co. near Nazareth; and Hercules Cement Co., Division of American Cement Corp. near Stockertown. Gravel was recovered and processed at a stationary plant near Bangor by Steckel Concrete Co., formerly owned by W. J. Lowe & Sons, Inc. Sand and gravel was recovered by Houdaille Construction Materials, Inc., near Portland and Lehigh Valley Sand & Gravel Co., Inc., near Easton. Finished natural and manufactured pigments, mostly brown and red, were produced by Minerals, Pigments, & Metals Division, Chas. Pfizer & Co., Inc., near Easton and Reichard-Coulston, Inc., near Bethlehem.

Northumberland.—Shale from stock was used by Watsonstown Products Co. in Watsonstown for linoleum filler. Watsonstown Brick Co. produced red shale, and Glen Gery Shale Brick Corp. produced shale both near Watsonstown for building brick manufacture. Limestone for concrete aggregate, roadstone, and agricultural purposes was produced by Meckley's Limestone Products, Inc., near Herndon. Clyde Starook produced a small amount of burnt lime for agricultural use near Northumberland.

Philadelphia.—Sand and gravel for building purposes and for city use was dredged from the Delaware River by The Liberty Corp. Gulf Oil Corp. recovered byproduct

sulfur from oil refinery gas at its Philadelphia plant using the Claus process. Atlantic Richfield Co. recovered hydrogen sulfide by the Girdler System, using diethanolamine and monethanolamine. United States Gypsum Co. produced calcined gypsum at its plant near Philadelphia.

Potter.—Sandstone was quarried for irregular-shaped stone and flagging by: Penn Kress Flagstone Co., Inc., M. D. Robinson Flagstone Co., Charles McCloskey near Austin; Lloyd A. Tyler near Odin; Carroll M. Winseck near Roulette; Arthur Coole near Coudersport; Moore & Purdy near Wharton; and John Majot near Bark Shanty.

Schuylkill.—Harbison-Walker Refractories Co. produced crushed quartzite near Andreas for silica brick manufacture. Crushed sandstone for concrete aggregate and roadstone was produced by Summit Quarries, Inc., near Summit Station. Huss Contracting Co. produced limestone near Andreas for concrete aggregate and roadstone. Industrial sand was recovered and processed at a stationary plant near Andreas by Refractory Sand Co., Inc. Shale was produced near Auburn by Auburn Brick Co. for the manufacture of building brick.

Somerset.—Strip mines producing bituminous coal reported 85 power shovels, 57 draglines, 82 bulldozers, 34 power drills, and 145 trucks. Twenty-two of the 58 underground mines loaded 1.1 million tons of coal mechanically with 17 continuous miners, 2 mobile loaders, and 24 hand-loaded face conveyors. Sixty-three cutting machines cut 328,000 tons. Eleven preparation plants prepared 2.2 million tons of clean coal, 1.2 million tons of which was strip coal and 1.0 million tons underground coal. Fifteen tipples crushed 1.5 million tons, and 8 plants treated 127,000 tons with oil. Plastic fire clay was produced near Somerset by C. Brant Mining Co., near Springs by Otto Brick & Tile Works, Inc., and by Harbison-Walker Refractories Co. at its Garrett open-pit. Flint fire clay for firebrick manufacture was produced near Shanksville by Svonavec, Inc. and by General Refractories Co. near Fort Hill and Rockwood.

Limestone was produced by Keystone Lime Co. near Springs and by Somerset Limestone Co., Inc., near Bakersville for

concrete aggregate, roadstone, agricultural purposes, and riprap. Sandstone was produced by Clarence Rodamer near Springs for stone sand and by Detwilers Industries, Inc., near Central City for concrete aggregate and roadstone. Sand for construction uses was recovered and processed at a stationary plant near Boswell by Boswell Sand Co.

Susquehanna.—Crushed sandstone for concrete aggregate and roadstone was produced by State Aggregates, Inc., near Montrose, who purchased the quarry from Susquehanna Quarry Co. early in the year; and by Keelor Supply Co., Inc., Bennett's quarry near Clifford. Sandstone for flagging was quarried by Powers Brothers Quarries near Birchardville; Lee A. Wilbur Flagstone Co. near Kingsley; Herbert Harvey & Sons near Springville; and Wade H. Swingle, Jr., near Harford. Mitchell Stone Co. near Springville and Susquehanna Bluestone Co. near Fairdale quarried irregular-shaped bluestone for construction work and flagging.

Tioga.—Strip mines producing bituminous coal reported 11 power shovels, 7 draglines, 14 bulldozers, 4 power drills, and 13 trucks. One preparation plant cleaned coal with pneumatic equipment and 2 tipples crushed 485,000 tons. Sand for foundry uses and gravel for road work was recovered and processed at a portable plant near Middlebury Center by Fredric M. Gee Gravel Co.

Venango.—Strip mines producing bituminous coal reported 13 power shovels, 8 draglines, 11 bulldozers, 3 power drills, and 52 trucks. Gravel for building, paving, fill, and other uses was recovered at a stationary plant near Titusville by White City Sand and Gravel Co. and near Oil City by Oil City Sand & Gravel Co. Pennsylvania Glass Sand Corp. produced industrial sand for molding and furnace uses at its Venango Works.

Washington.—Twelve of the 15 underground mines loaded 13.5 million tons of bituminous coal mechanically with 67 continuous miners and 40 mobile loaders, of which 9 were used with continuous miners. Thirty-one cutting machines cut 4.1 million tons. Strip mines reported 21 power shovels, 5 draglines, 22 bulldozers, 7 power drills, and 37 trucks. Seven preparation plants prepared 12.4 million tons of clean

coal, 12.2 million tons of which was underground coal. Seven mine tipples crushed 6.9 million tons, and 3 plants treated 1.0 million tons with oil. Limestone was produced by Washington Stone Co., Inc., near Washington for concrete aggregate and roadstone.

Wayne.—Sandstone flagging, irregular-shaped construction stone, and cut architectural stone were quarried by Sterling Quarries, Inc., W. R. Strong & Son, and Paul Tompkins Estate. Crushed sandstone was produced near Lake Ariel by Wayne Crushed Stone, Inc., for concrete aggregate and roadstone. Sand for building purposes was recovered at the Willis Black Sand & Gravel pit near Lake Ariel. Sand and gravel for paving purposes was recovered and processed by Keystone Pavement & Construction Co., Inc., at its stationary plant near Lake Ariel.

Westmoreland.—Eight of the 24 underground mines loaded 3.5 million tons of bituminous coal mechanically with 20 continuous miners, 16 mobile loaders (8 of which were used with continuous miners), and 2 hand-loaded face conveyors. Twenty-four cutting machines cut 709,000 tons. Strip mines reported 24 power shovels, 7 draglines, 27 bulldozers, 9 power drills, and 35 trucks. Five preparation plants prepared 3.2 million tons of clean coal, all of which was mined underground. Seven mine tipples crushed 2.2 million tons and two plants treated 1.7 million tons with oil and other materials. Sand and gravel was recovered by dredging the Allegheny River near New Kensington by Davison Sand & Gravel Co. and processed for construction purposes.

Crushed sandstone for concrete aggregate was produced by J. M. Hall, Inc., near Baggaley; Eidemiller Enterprises, Inc., near Whitney; Penn Aggregates near Jeannette; Murrysburg Bluestone Co., Inc., near Murrysburg; and Latrobe Construction Co. near Ligonier. Crushed shale was produced by Clayton H. Remaley near Sardis for drive-ways and filter beds and by Reifschneider Brothers near Lower Burrell for concrete aggregate and roadstone. Dimension sandstone was quarried by Clifford B. Wareham near Irwin for irregular-shaped stone for construction work and by Lynn's Quarry near Belle Vernon for flagging. Limestone was produced by Agricultural Lime &

Stone Co. in Derry Township and by Paul W. Kendi & Sons., Inc., near Mt. Pleasant for concrete aggregate, roadstone, agricultural purposes, and lime manufacture. Shale was produced near Trafford by Charles Kunkle for use by Pitt & Suburban Brick Co. A small amount of high-magnesium lime for agricultural purposes was produced by Agricultural Lime & Stone Co. near Derry.

Wyoming.—Sand and gravel was recovered and processed at the Wyoanna plant near Falls by Wyoming Sand & Stone Co. for building, paving, and antiskid purposes. Sandstone was quarried by J. G. Robinson, Inc., near Ft. Washington for flagging.

York.—Portland and masonry cement was produced by Medusa Portland Cement Co. near York. Most of the portland cement was the general use and moderate heat type, but substantial quantities of white and high-early-strength were also produced. Shipments were mainly in bulk and shipped by railroad. Most of the cement was sold to ready-mixed concrete companies with a large amount also sold to concrete product manufacturers. Limestone was produced by Klines Quarry, Inc., near

Wrightsville; Standard Concrete Products Co. near York; York Building Products Co., Inc., near Thomasville; Codorus Stone & Supply Co., Inc., near Mt. Wolf; Thomasville Stone & Lime Co. near Thomasville; White Pigment Corp. near York; York Stone & Supply Co., National Gypsum Co., The J. E. Baker Co., and by Medusa Portland Cement Co. all near York.

The Ruberoid Co. processed crushed slate near Delta for granules and flour. Shale was produced near York by Glen Gery Shale Brick Corp. for the manufacture of building brick at its York Colonial Division. Miscellaneous clay was produced by Medusa Portland Cement Co. near York for use in the manufacture of portland and other hydraulic cements. Sand for building purposes was recovered and processed at a stationary plant near York by Neuman Sand & Supply Co. and by Pennsy Supply, Inc., near York Haven. General Mining Associates recovered crude flake mica near York and air-separated it for sales to paint, roofing, rubber (mold lubricant), grease, welding rods, insulation (electric), and textile coating manufacturers. Pennsylvania Perlite Corp. expanded perlite near York chiefly for use in building plaster.